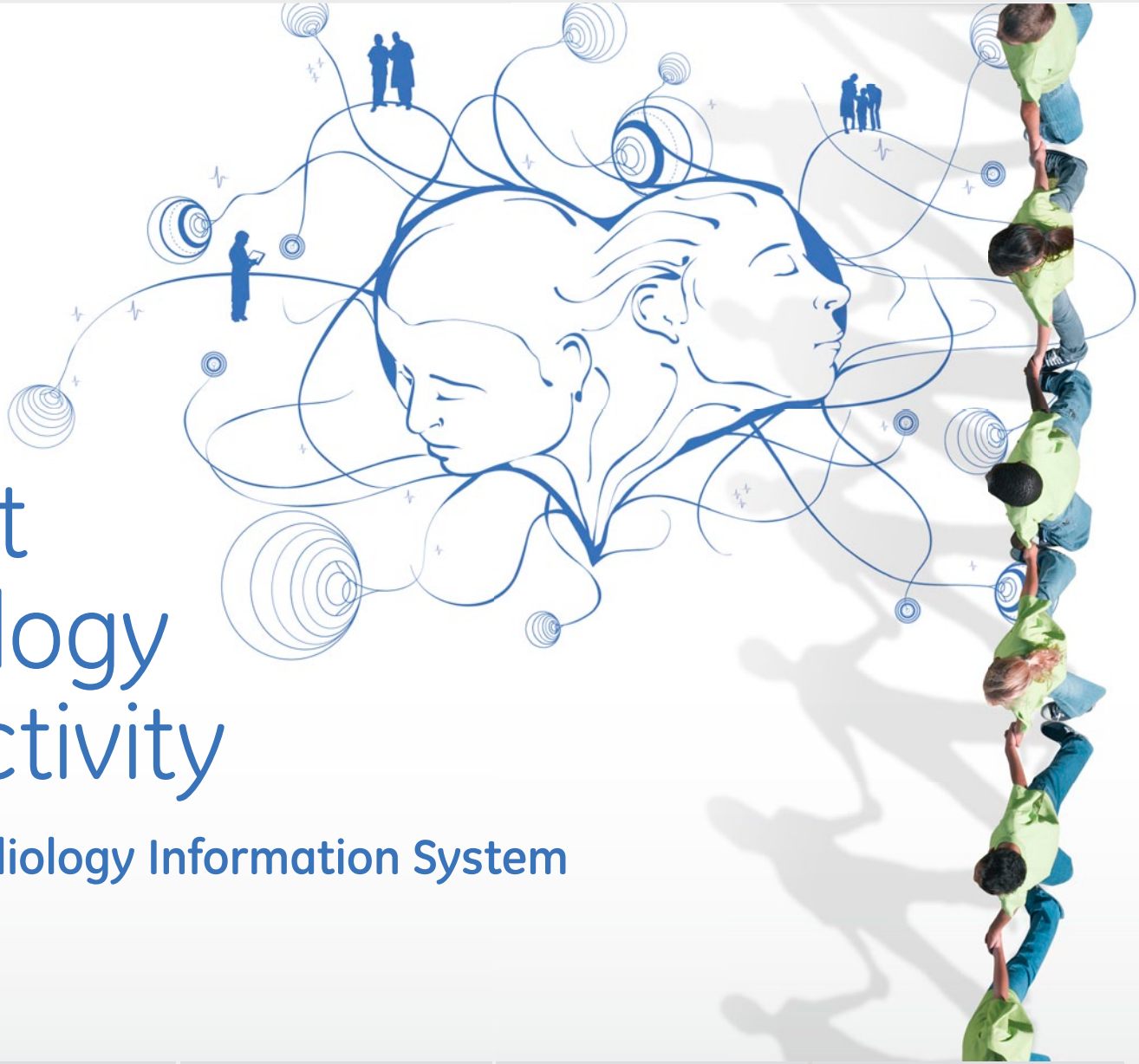
MAC* 5500 HD

MUSE* v8

Skip intro

Enter

GE Healthcare



The heart of cardiology is connectivity

The MUSE* v8 Cardiology Information System

The clinical decision support you trust. For the outcomes you expect.

To deliver exceptional patient care, you need the most advanced tools built into technology you can count on. Proven. Easy to use. Always within reach.

GE Healthcare ECG decision support programs are built on the Marquette* 12SL* legacy, and you'll find them in our leading diagnostic ECG and monitoring systems and integrated into many other diagnostic cardiology products—designed to work together, and to work as quickly as you do.

MUSE* v8 is part of our ongoing commitment to advancing the science of ECG interpretation. With the high level of clinical accuracy you trust. With the validity you demand. And with the performance you need to quickly make confident decisions that lead to the best possible outcomes.

Clinical excellence just got an upgrade

In a healthcare world driven by data, MUSE v8 is your link to a more efficient system of care. With seamless connections to ECG diagnostic systems, monitoring systems, Hospital Information Systems (HIS) and electronic medical records (EMRs), MUSE v8 manages and directs the flow of ECG information—to help speed the ECG analysis process and enable faster patient care.

Advanced ECG analysis support: Support your clinical expertise with the proven Marquette 12SL algorithms, plus new clinical features, including pacemaker detection in MAC* 5500 HD and annotation in MUSE v8† and 12SL ECG reanalysis.

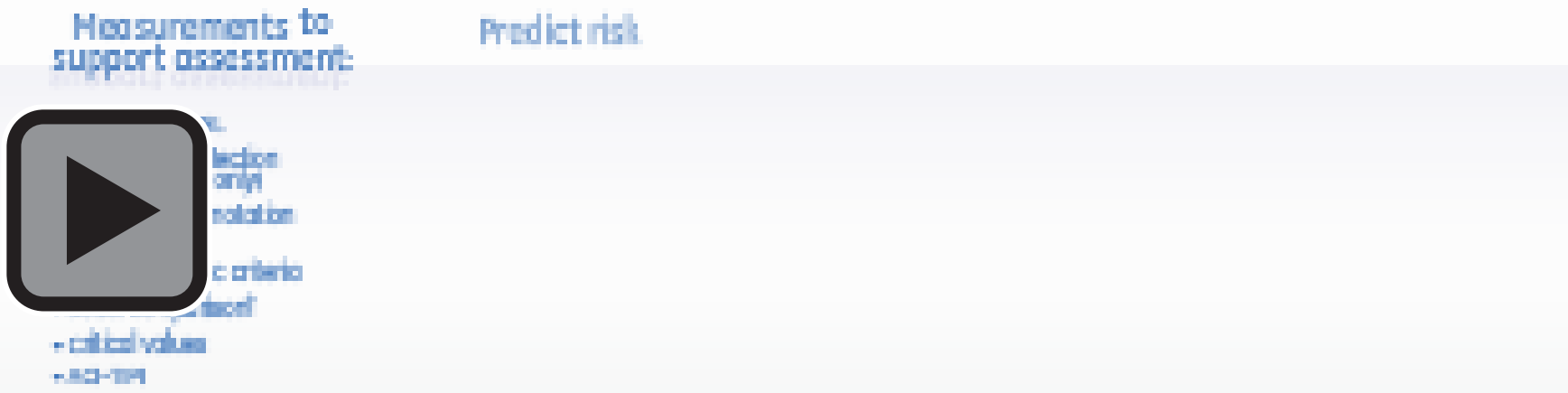
Serial comparison: Helps you to detect myocardial infarction more easily by comparing current and previous ECG test results.

Streamlined ECG workflow: Pull data from your ECG acquisition system and send it to your HIS or EMR in one click. Access ECG test data anytime, from anywhere via secure online connections.

†Pacemaker detection capability available in MAC 5500 HD, annotation in MUSE v8

Comprehensive portfolio of decision support tools

Diagnostic confidence requires accurate information and expert decision support. GE Healthcare supports your expertise with access to one of the most comprehensive portfolios of ECG clinical decision support tools.



††Available only in MUSE ECG Management System

Innovation means never standing still

Leading the way in cardiology care means paving the way to new capabilities. Our ongoing ECG decision support development is led by a team of the industry's leading scientists, enabling us to provide physicians with breakthroughs in arrhythmia detection, chest pain assessment, risk stratification, and disease management. Validation against global, clinically verified databases helps ensure accuracy with multiple patient populations.

This commitment to innovation is realized through the MUSE v8 and MAC 5500 HD workflow.

Improved pacemaker detection and annotation

Higher sample rates help detect pulses as faint as 0.2 ms in duration in MAC 5500 HD[1]

12SL ECG reanalysis

Allows you to reanalyze older ECGs with our most recent algorithms

Configurable critical values available in MAC 5500 HD

Helps clinicians quickly identify the most at-risk patients

Serial comparison available in MUSE v8

View and compare current and previous ECGs on one screen

Marquette 12SL ECG analysis program

One of the most validated clinical algorithm programs, with citations in more than 150 scientific journals

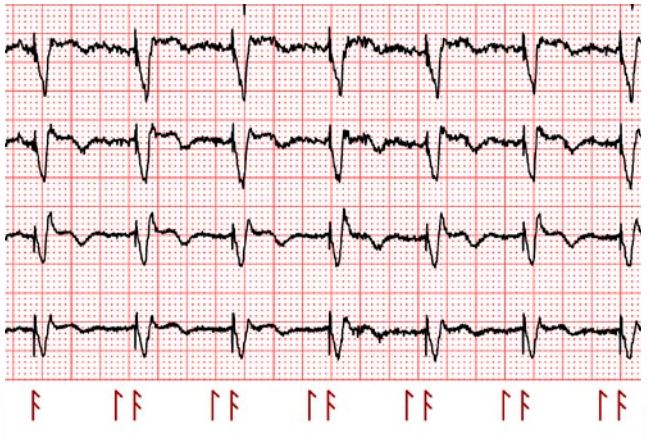
[1]Ricke AD, Swiryn S, Bauernfeind RA, Conner JA, Young B, Rowlandson GI. Improved pacemaker pulse detection: clinical evaluation of a new high-bandwidth electrocardiographic system. *J Electrocardiol* 2010. Co-authored in part by GE Healthcare employees.

The smallest detail makes a huge difference: pacemaker detection

Current pacemakers use a minimal amount of electrical current to do their job—making them difficult to detect in standard ECGs.

Pacemaker detection in the MAC 5500 HD, with annotation in MUSE v8, detects pacemaker pulses more accurately, reducing the risk of treatment contraindicated for paced patients.[1]

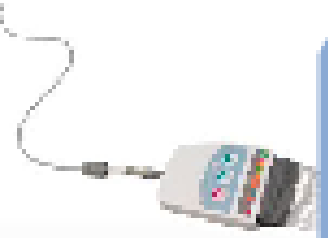
- **High sample rates:** The MAC 5500 HD uses a high sample rate (75,000 samples per second) to detect pacemaker pulses as faint as 0.2 ms in duration and 0.5-mV in amplitude.
- **Reliable noise rejection:** Improved technology rules out muscle artifact or static discharge as pacing signals.
- **Visualize pulses more clearly at MUSE v8:** A dedicated pace-annotation channel helps reduce the need to identify pacer pulses within the ECG signal and speeds diagnosis when moments can make a difference. It even detects biventricular pacemakers.



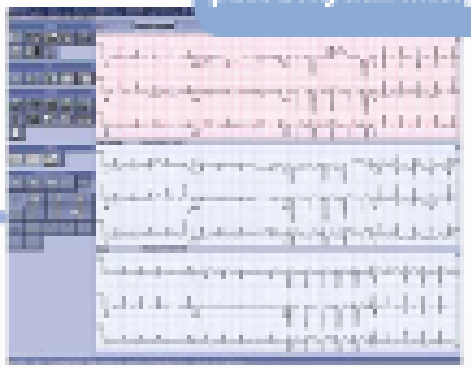
New pacemaker annotation channel in MUSE v8

[1]Ricke AD, Swiryn S, Bauernfeind RA, Conner JA, Young B, Rowlandson GI. Improved pacemaker pulse detection: clinical evaluation of a new high-bandwidth electrocardiographic system. *J Electrocardiol* 2010. Co-authored in part by GE Healthcare employees.

Proven power: HD Pacemaker workflow



The CAM HD detects pacemaker pulses and sends the pace channel information to the cardiograph.



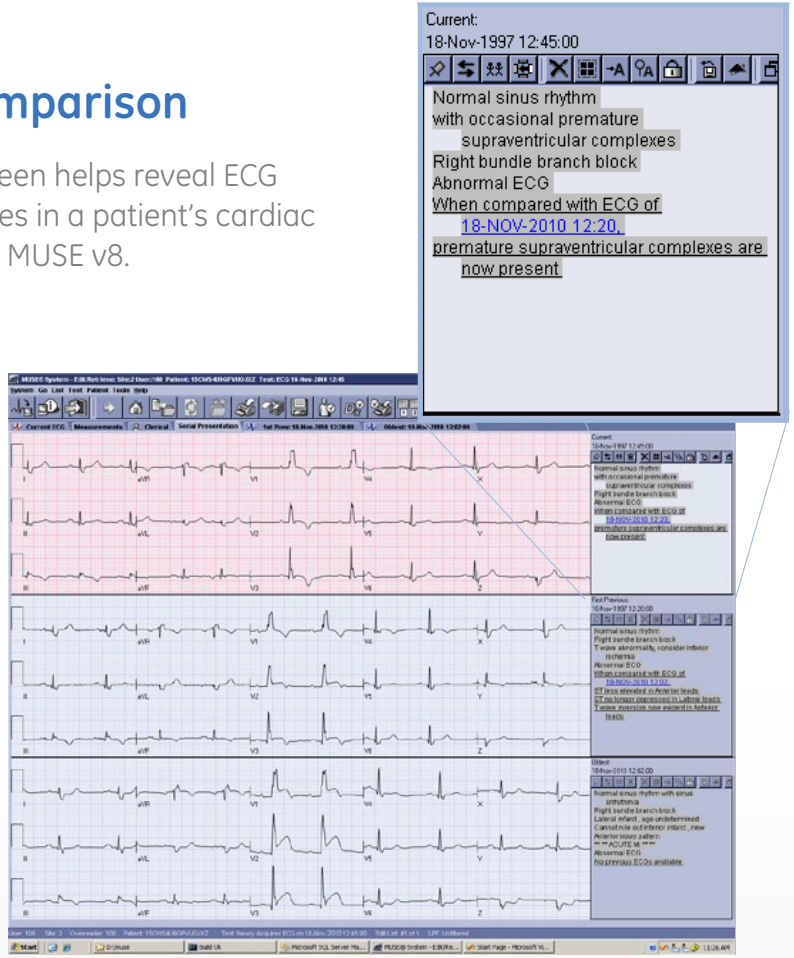
MUSE v8 displays the stored ECG for later review. This includes annotations for pacemaker pulses and new 12SL paced rhythm interpretations.

MAC 5500 HD displays new 12SL paced rhythm interpretations.

Where the past and future meet: serial comparison

The ability to view and compare current and previous ECGs on one screen helps reveal ECG differences over time—enabling you to more confidently assess changes in a patient's cardiac status. The Marquette 12SL Serial Comparison program is available on MUSE v8.

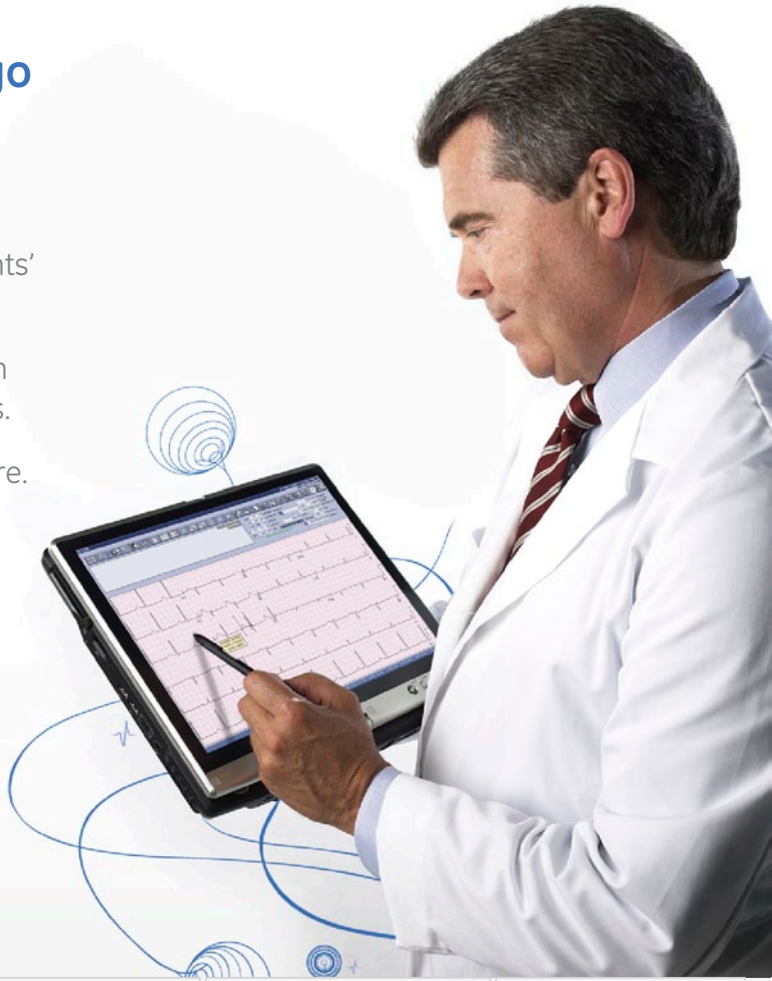
- **State changes more clearly and concisely:** The program uses simple, familiar language to clearly state clinically significant changes in rhythm, P, QRS, ST, and T-waves.
- **Comparing waveforms for maximum accuracy:** The program uses ECG measurements and waveform comparison techniques to maximize performance and comparison accuracy.
- **Serial presentation:**
  View current, first previous, and oldest ECGs on a single page to see changes over time.



Ready where you are: ECG overread options to go

Positive outcomes often depend on fast access to information. That means you must be able to easily access ECG data from many locations—the hospital, the office, anywhere. MUSE v8 enables rapid access to current and past patients' resting ECG data, exercise tests, and Holter results, as well as connecting patients' data across the care continuum to speed critical decision-making.

- **Flexible ECG editing capabilities:** MUSE v8 delivers remote access paired with enhanced editing capabilities, including the ability to rerun serial comparisons.
- **Secure online access:** View, edit, and send MUSE data anytime, from anywhere.
- **Automated ECG interpretation:** Support your clinical decision with proven tools available through the trusted Marquette 12SL program.



Finding time: It's in the data

Working efficiently demands fast, seamless connectivity across the entire hospital enterprise. Linking multiple devices. Communicating to HIS and EMR. And speeding ECG workflow without sacrificing diagnostic performance.

MUSE has long been known for leadership in ECG information management. Today, MUSE v8 puts the entire cardiology workflow at your fingertips, enabling you to streamline data flow, simplify demographic and data acquisition, and save time.

Admission, discharge, and transfer (ADT) system query

Integrates data with HIS

more ▸

Expanded order downloads

Enables more efficient patient throughput

more ▸

Demographic Complete Function

Automatically activates the charge capture process

more ▸

Batch data transfer

Streamlines workflow and billing with more efficient HIS updates

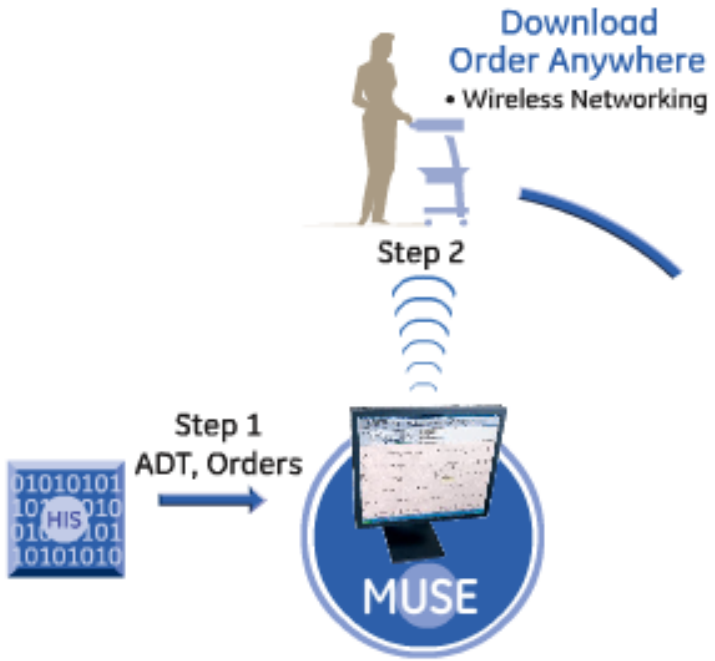
more ▸

Automatic merges and updates

Helps improve the accuracy of patient records and saves time

more ▸

Access an easier way to work



Wireless communication between the MAC 5500 HD resting ECG device and MUSE v8, provided via MobileLink, gives physicians and clinicians more streamlined and simplified workflow.*

Shaping the future of cardiac care: research and education

MUSE v8 also supports your faculty's research and teaching efforts with scientific tools that enable detailed 12SL ECG reanalysis, create anonymous teaching data, and more.

Interval editor: MUSE v8 gives you the power to complete detailed analyses of individual complexes within a waveform, such as measuring QT interval.

12SL ECG reanalysis: Gain the advantage of the latest MUSE v8 to reanalyze ECGs through the most recent 12SL analysis program.

Teaching support file: A separate site within the MUSE v8 system allows you to select specific ECGs to store for research and teaching purposes. This avoids the cost of a separate research system and saves the time required to make selected data anonymous—the MUSE v8 can perform this task.

We're behind the scenes. Keeping you center stage.

It's this simple: You don't have the time to wait for troubleshooting or repairs. We provide experienced technical support and training to enable you and your patients to get the most benefits from the MUSE v8 system.

Technical support and training varies by region. Please check with your local GE sales representative.

About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement, and performance solutions services helps our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our "healthymagination" vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

GE Healthcare, a division of General Electric Company

www.gehealthcare.com

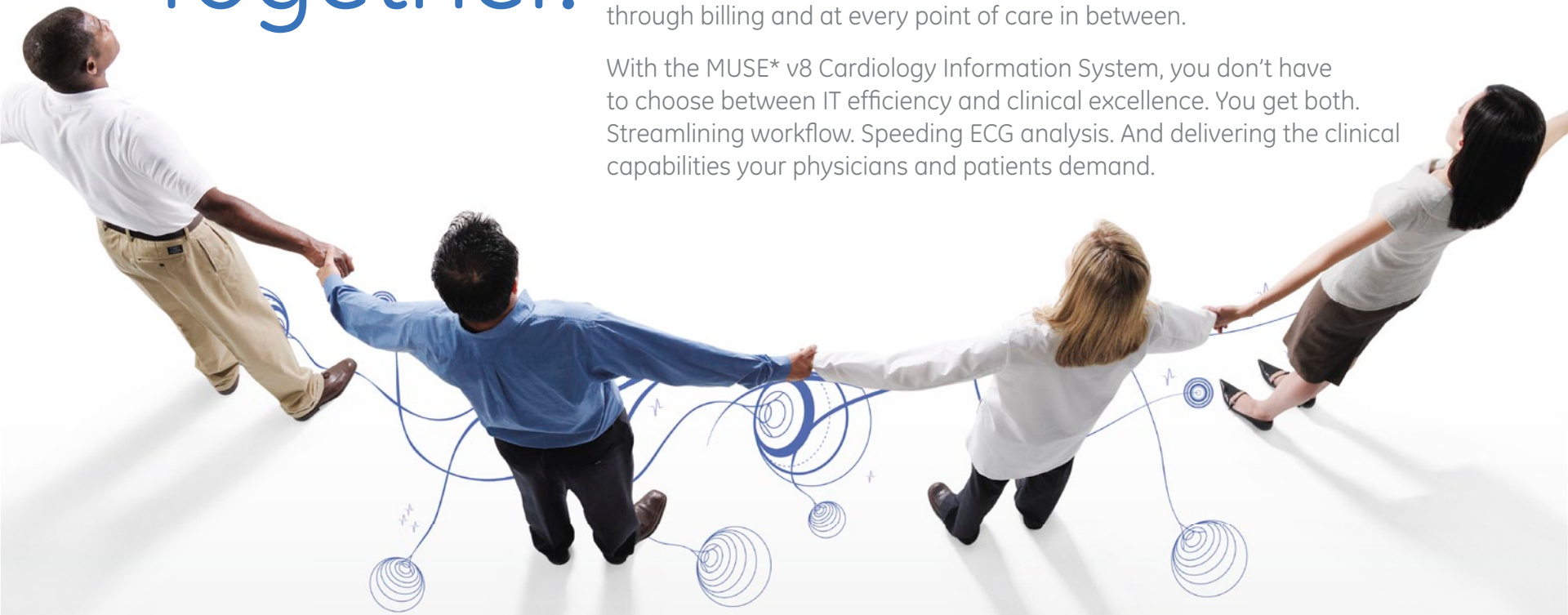
imagination at work

DOC0976011

Advancing technology integration. Together.

Your healthcare enterprise depends upon complex technology systems working together. Data must flow efficiently from patient admission through billing and at every point of care in between.

With the MUSE* v8 Cardiology Information System, you don't have to choose between IT efficiency and clinical excellence. You get both. Streamlining workflow. Speeding ECG analysis. And delivering the clinical capabilities your physicians and patients demand.



Open system architecture | Scalability | HIS & EMR integration | Device connectivity | Data security & disaster recovery | Excellent support | Advanced clinical tools

The best technology understands the people who use it, not the other way around. With MUSE v8, we work with you to provide the tools, the security, and the efficiency you need for the most complex clinical environments.

Setting the standard. Open system architecture.

GE Healthcare helped establish the industry standards for data security and connectivity, and we stand behind them every day. MUSE v8 delivers an integrated technology solution that merges the IT efficiency you need with the clinical excellence your physicians demand.

Health Level Seven (HL7) compliant: MUSE v8 is ODBC compliant and uses well-established data-sharing, communication, and security standards, including Microsoft** SQL server and HL7 interfaces.

Connectivity with third-party devices: MUSE v8 uses XML interfaces to support data import and export from third-party vendors,† so you can maintain complete functionality with your existing ECG systems from GE Healthcare or others.

more ▸ **Interfaces with HIS/EMR vendors:** MUSE enables complete HIS and EMR integration, with more than 925 individual interfaces to HIS/EMR vendors.

†Ask your GE sales representative for list of vendors

No more growing pains. Stretch your resources with IT scalability.

Whether you are operating in an office or enterprise environment, our experienced team can help you plan and implement the system that can maximize your resources while providing clinical and administrative workflow efficiencies. As your facility continues to grow, we can help you upgrade to a more sophisticated system, with no loss of data.

One source, complete connectivity: HIS and EMR integration

Open connectivity and bi-directional workflow are the foundation of a seamless end-to-end workflow, enabling complete functionality with your existing administrative and clinical system interfaces. MUSE v8 connects with your HIS and EMR systems using standards such as HL7, Web-based URL links, and GE's Application Program Interface (API).

MUSE v8 helps you create one integrated, flexible technology powerhouse that speeds data processing from patient check-in through billing.

- **Reduce data entry errors** with automated patient demographic data merges and updates.
- **Streamline administrative workflow and billing** through efficient batch data transfer.
- **Support clinical excellence and efficiency** via wireless connectivity that promotes workflow efficiencies at every point of care.

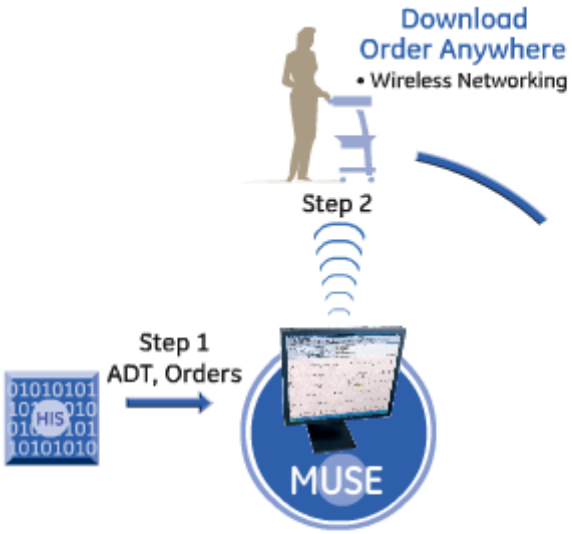
The key to better workflow: physician access to data

Increasing productivity and improving patient outcomes both depend upon fast physician access to patient data. MUSE v8 enables rapid physician access to resting ECG data, exercise tests, and Holter results, as well as connecting patient data across the care continuum. It's designed to support fast, accurate decision-making at every point of patient care.

MUSE enhances productivity: MUSE v8 supports fast review of clinical data with access from remote sites that are connected to a LAN or WAN.

MUSE enables rapid diagnosis: Physicians can connect from anywhere to view, edit, and confirm ECGs, stress test data, and Holter data.

MUSE helps increase data accuracy: MUSE v8 provides expanded data access to speed patient throughput and avoid the need for manual data re-entry, helping to reduce the potential for data entry errors.



Wireless communication between the MAC 5500 HD resting ECG device and MUSE v8, provided via MobileLink*, gives physicians and clinicians more streamlined and simplified workflow.*

Connecting data and diagnosis. Fast.

Better workflow starts with simple, seamless connectivity across the entire hospital enterprise. Linking multiple devices. Communicating to HIS and EMR. And giving physicians the access to data they need at every point in the process to help speed diagnosis and streamline patient care.

MUSE has long been known for leadership in ECG information management. Today, MUSE v8 enables you to take advantage of an efficient digital IT workflow.

Admission, discharge, and transfer (ADT) system query

Integrates data with HIS

more ▸

Expanded order downloads

Enables more efficient patient throughput

more ▸

Demographic Complete Function

Automatically activates the charge capture process

more ▸

Batch data transfer

Streamlines workflow and billing with more efficient HIS updates

more ▸

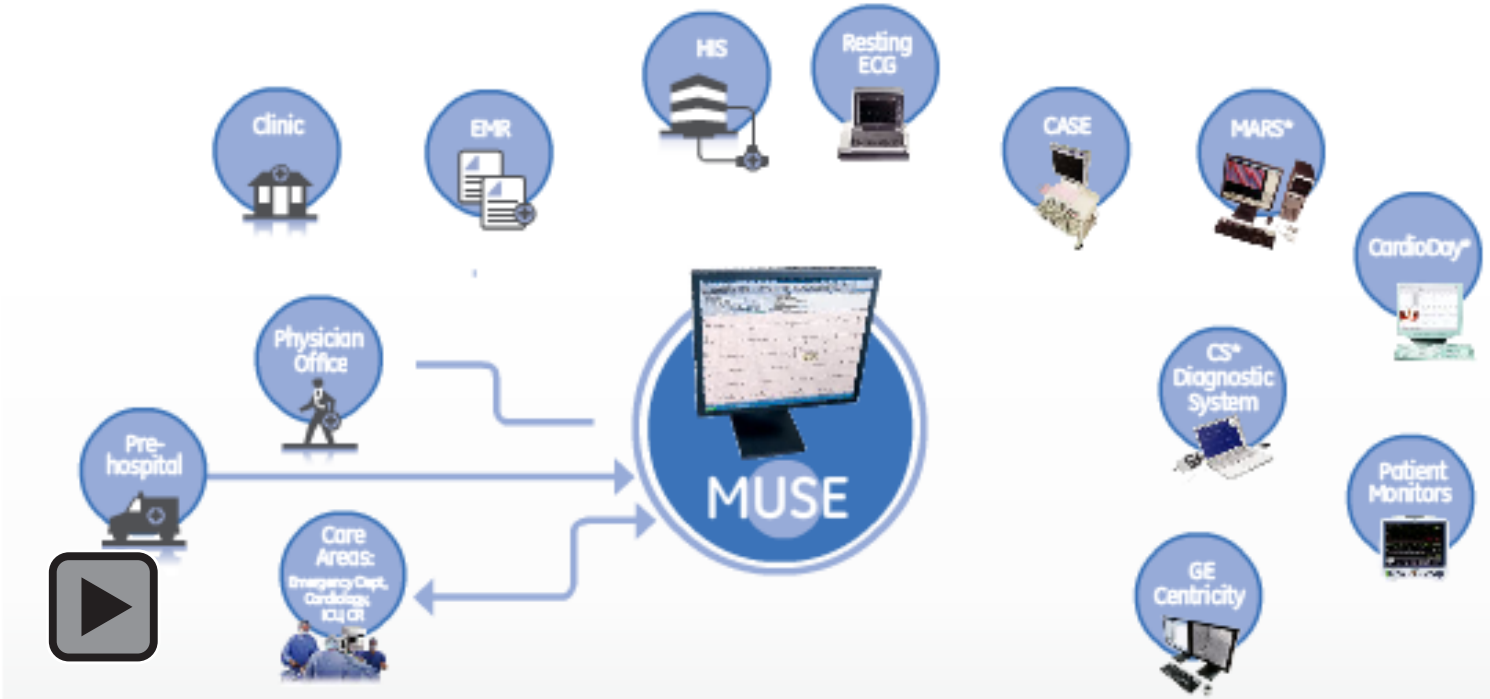
Automatic merges and updates

Helps improve the accuracy of patient records and saves time

more ▸

The heart of cardiology is connectivity

The demands of your healthcare facility mean you need to provide flexible options for connectivity and data sharing from a wide variety of diagnostic cardiology devices. MUSE v8 links your systems and departments to one complete, efficient solution.



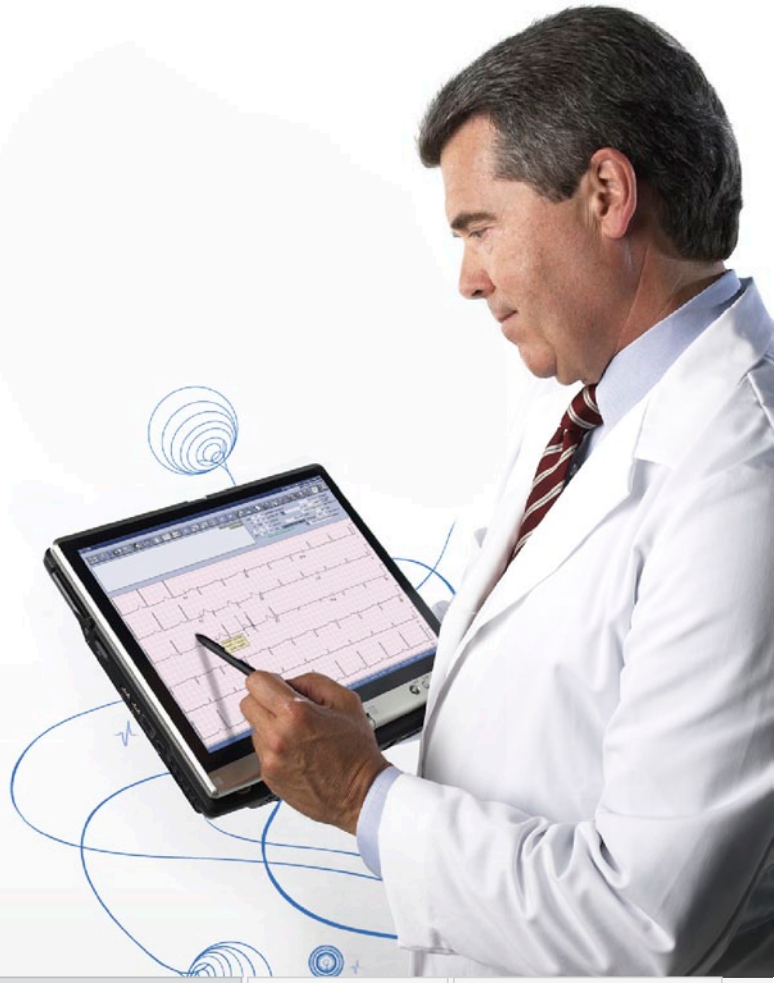
Access from anywhere: the express lane to productivity

Improve ECG workflow throughout the hospital—while protecting the security of your facility's data.

MUSE v8 provides the wireless connectivity physicians need to securely access, view, edit, and send ECG data anytime, from anywhere. MUSE v8 helps you meet the needs of your physicians by connecting to most email systems.

Bi-directional connectivity: Data flows using HL7 for HIS and EMR integration with diagnostic cardiology devices via MUSE v8.

Flexible, secure data access: MUSE EveryWARE can help make your facility more efficient by allowing physicians to view, edit, and confirm ECGs, stress test data, and Holter results wirelessly, from anywhere.



Your high-level security checkpoint

From the moment of data capture and at every point in the system, your IT solution must keep patient data secure and confidential, while ensuring access to caregivers whenever and wherever it's needed.

Facilitates HIPAA compliance: MUSE v8 integrates with your security and access systems while providing encryption and protection of data. Audit capabilities include change logs and location of data access.

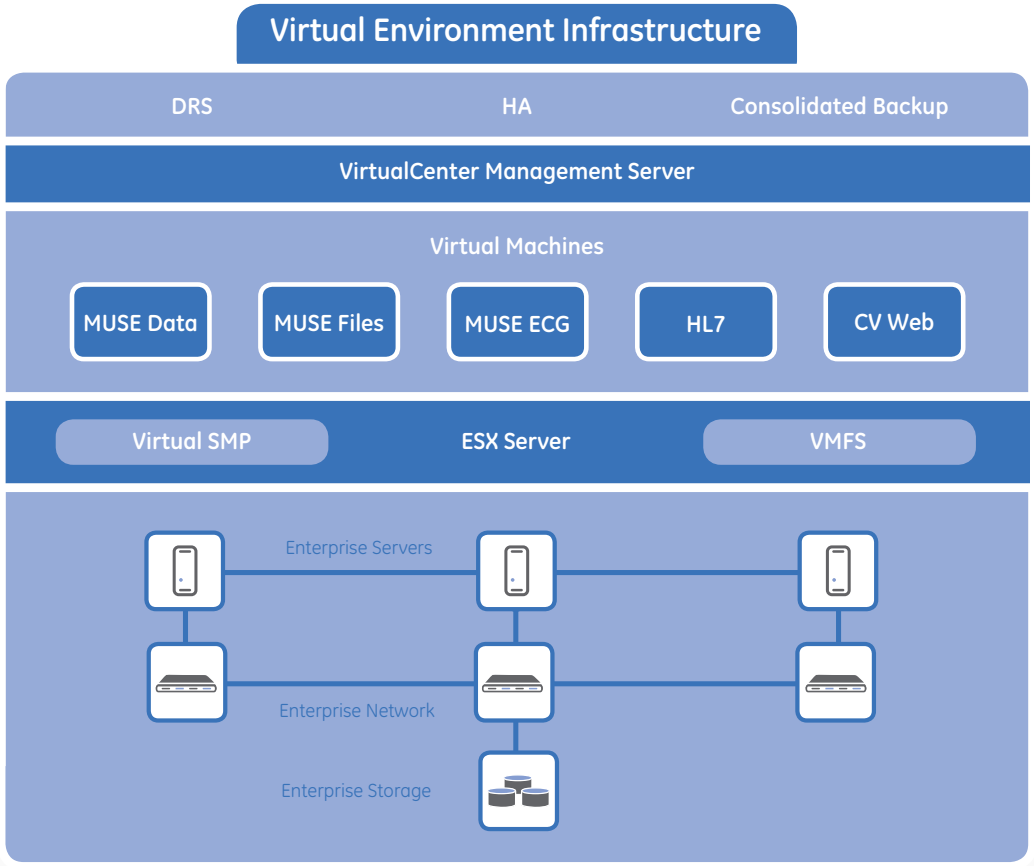
Provides desktop virtualization capabilities: MUSE v8 desktop virtualization uses the Citrix** application and provides access to the full-featured editing capabilities of MUSE Editor.

Reduces your hardware footprint: MUSE v8 enables the use of blade servers or multiple virtual machines operating on a single server.

Optimize your infrastructure: MUSE with virtual environments

Protecting your facility's IT infrastructure and data in the event of a disruptive situation has become increasingly important in recent years. MUSE v8 supports industry-leading solutions that help protect your system and lower costs.

MUSE v8 can be hosted as a virtual machine on VMware** or an equivalent system for infrastructure optimization, lifecycle management, and disaster recovery.



We are part of your team: excellent support, always available

Dedicated IT project managers, HL7 specialists, database conversion specialists, and field engineers work with you to ensure you get the most from your technology investment.

Technical support and training varies by region. Please check with your local GE sales representative.

Protecting your investment. Managing costs.

GE Healthcare offers a Software Support Service Solution[††] that helps you keep your MUSE software updated and maintains your equipment to stringent GE Healthcare performance standards.

- **Reduces downtime:** We'll help keep your facility running smoothly and productively
- **Accelerates fast response times** and resolution of your service issues
- **Helps manage costs** by making software and software management an integral part of your operating budget, for a predictable annual expense
- **Minimizes unexpected surprises** and frustrations in system implementation

You can gain the confidence of having one of the largest, most experienced service organizations in the industry working with you to protect your technology investment.

[††]Availability varies by country

Making the clinical connection fast and easy

Clinicians expect the best diagnostic tools to be readily available with data integration across your facility. MUSE v8 helps you achieve both goals, with uncompromised clinical quality supported by a smooth flow of information—because today's diagnostic excellence is dependent on efficient data flow.

Comprehensive portfolio of ECG analysis tools: With citations in more than 150 scientific journals, the Marquette* 12SL* ECG analysis program is one of the most validated in the industry—making us a preferred choice for physicians worldwide.

Flexible ECG editing capabilities: Enhanced editing capabilities within MUSE v8 streamlines the process of overreading ECGs, with remote data access and the ability to rerun serial comparisons to support more informed diagnosis.

Making your data do even more: research and teaching support

Many hospitals extend their expertise through research and teaching, placing additional demands on the IT system because existing data must be made anonymous and reviewed in new ways. MUSE v8 supports the research and teaching efforts of your physicians without the need to reconfigure data or install a separate system.

Avoids duplicate system costs: A separate site within MUSE v8 allows physicians to select specific ECGs to store for research and teaching, avoiding the cost of a separate research system.

Data anonymity: MUSE v8 makes data anonymous when it is selected for research and teaching purposes, saving the time normally required to manually eliminate identifying patient data.

About GE Healthcare

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Our "healthymagination" vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

www.gehealthcare.com

imagination at work

DOC0976011

Cardiac technology. Innovation to advance care.

Success in today's healthcare environment requires your enterprise to be seamlessly connected. Physicians, clinical care staff, administration, billing, and the IT department must be able to share and send information anywhere, anytime—easily.

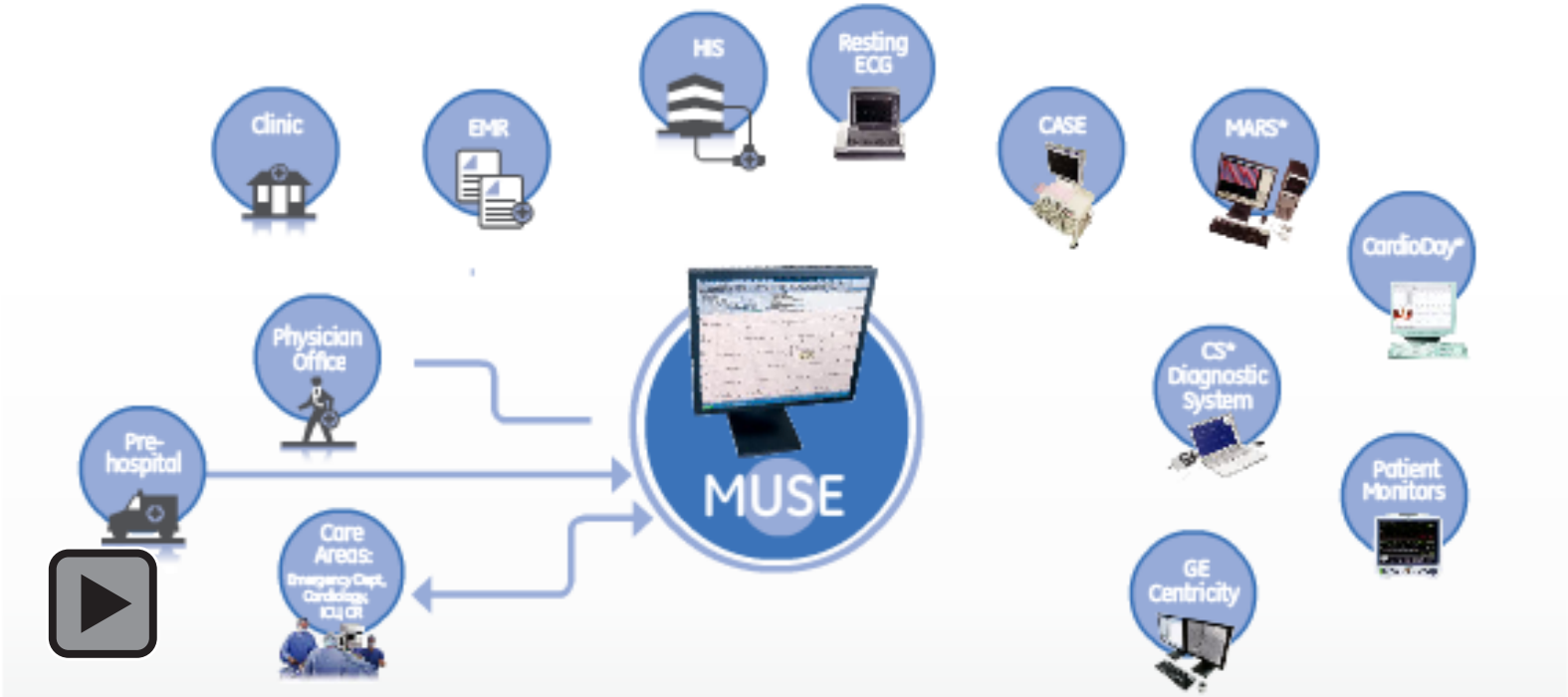
MUSE* v8 enables the connectivity your facility needs, in ways that allow you to deliver superior patient care while managing costs.

Cardiology connectivity | Quality and efficiency | Measurable outcomes | Leading diagnostic tools | Experienced support

MUSE Clinical Excellence | MUSE IT Connectivity | MUSE Leading Innovation | More About MUSE

The heart of cardiology is connectivity

To manage the needs of a busy cardiology department, you need diagnostic systems that work together efficiently as one complete solution. With MUSE v8, you can link your systems and departments into one integrated, flexible powerhouse that helps you streamline data flow, save time, and stay at the forefront of cardiology.



Connected to patients from admission to discharge. And every point in between.

Increasing efficiency throughout your facility means finding ways to streamline every step of your facility's workflow to optimize financial, administrative, and clinical processes, from ECG acquisition to billing. MUSE v8 works with GE Healthcare diagnostic cardiology devices and major HIS and EMR systems, supporting rapid clinical decisions that can help enable better care and improve productivity, with:

- Confident patient triage through integrated ECG data flow
- Remote access to current and past patients' resting ECG data, exercise tests, and Holter results
- Efficient clinical and administrative workflow through automatic patient demographics and charge capture, enabling clinicians to focus on patient care

more ▸

"The MUSE technology has been a key element in our ability to quickly diagnose heart attacks occurring in remote locations. It allows us to acquire an EKG in the field, send that EKG to the emergency department, diagnose that patient, and activate the cath lab team in a matter of minutes. Before it could sometimes take hours to be able to do that."

Scott Garavet
Cardiovascular Service Line Administrator
Aspirus Hospital

Making the practice of cardiology faster and smarter: HIS & EMR integration

Today's healthcare environment demands seamless connectivity to your acquisition devices and your HIS and EMR systems. MUSE v8 delivers HIS and EMR integration via industry-standard best practices that GE Healthcare helped to develop. We use standards for open system architecture, including HL7. This level of connectivity enables MUSE v8 to provide a streamlined ECG workflow for clinicians, physicians, and administrators—leading to faster and easier processes at every point of care.

- **Batch billing and automatic data merges/updates:** Connectivity through MUSE v8 to your facility's HIS helps save time, streamline workflow, and increase the accuracy of patient demographic data as well as charge capture.
- **Expanded order download capabilities:** Bi-directional connectivity through MUSE v8 allows clinicians to download ADT information and orders from HIS and ECG acquisition devices.
- **Automatic report transmission:** MAC* Resting ECGs,† CASE Exercise Testing, and MARS Ambulatory System automatically transmit patient test reports into your facility's HIS/EMR via MUSE.
- **Secure access across the enterprise:** MUSE enables secure access to your patients' ECG data across sites of care within the hospital and with your broader physician network outside your hospital.

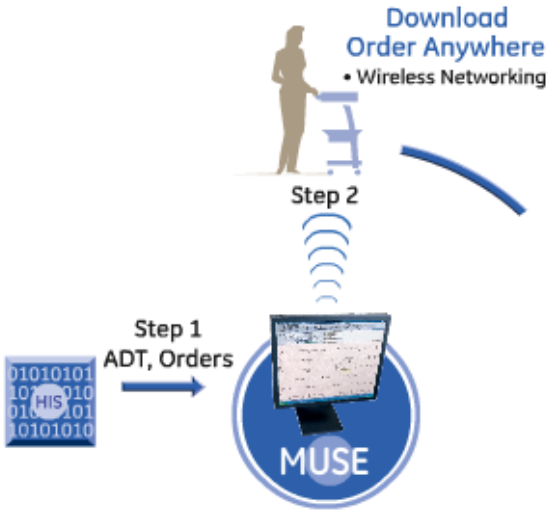
more ▸

†Not valid for all MAC products. Please check with your local GE sales representative.

Your link to streamlined ECG workflow

Real efficiency starts with understanding the needs of clinicians, physicians, and patients. MUSE v8 helps streamline every step in the process of ECG acquisition and processing throughout your facility with the integration and connectivity of our entire suite of diagnostic products. It's a difference you can measure in patient throughput and staff satisfaction.

- **Streamlined ECG workflow:** Wireless communication between the MAC 5500 HD†† Resting ECG and MUSE v8 via MobileLink* simplifies ECG acquisition from initial order through data acquisition and review.



Simplified Workflow with MobileLink

††MobileLink option also available on MAC 5500 and MAC 3500.

Protecting your patients and your investment: data security

Access is vital to your facility's productivity—and security is essential to your hospital's success. MUSE v8 protects patient data security and confidentiality through advanced security tools, including access controls, user authentication, encryption, and backup/restore functions.

- **Data security and disaster recovery:** MUSE v8 can be hosted as a virtual machine on VMware** or an equivalent system for infrastructure optimization, lifecycle management, and disaster recovery.

The measure of your success

Return on investment. That's the standard against which any solution must be measured in the current healthcare environment. MUSE v8 helps you make the connection between performance and results, so you can ensure every dollar spent pays off.

- **Workflow efficiency:** Physician access to data supports confident diagnosis and helps improve quality of care.
- **Efficient billing:** Capture your revenue with faster online billing capabilities.
- **Integrated diagnostic systems:** A comprehensive portfolio of diagnostic decision support products.

"Some physicians who were initially opposed to moving to a computer system are now among the biggest supporters of the new system. And I think the biggest motivator is patient safety. This is a better way to take care of acutely ill patients in the hospital setting with more accurate and more rapid interpretation."

Dr. Douglas Westveer
Chief, Cardiology
Beaumont Hospital, Troy

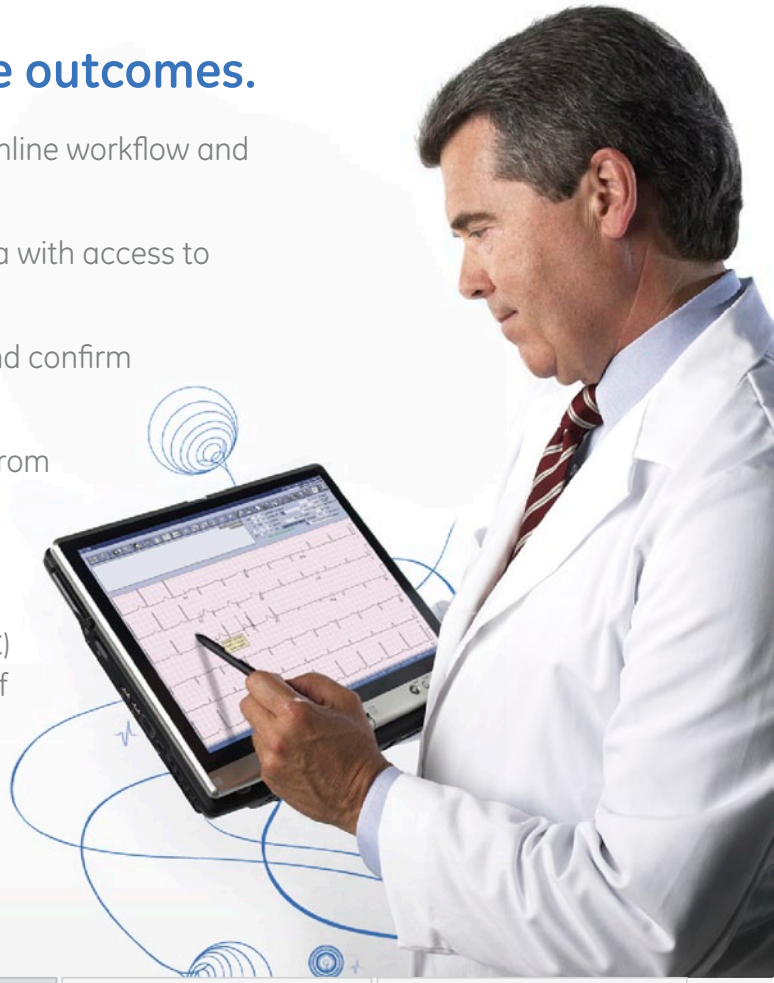
Data access. Opening the door to measurable outcomes.

By providing your physicians easy access to patient data, MUSE v8 helps streamline workflow and assists clinicians in making faster and informed decisions.

- **Enhancing productivity:** The system enables faster review of clinical data with access to MUSE from remote sites that are connected to a LAN or WAN.
- **Enabling access:** Physicians can connect from anywhere to view, edit, and confirm ECGs, stress test data, and Holter data.

more ▸ **Helps to reduce door-to-balloon time:** MUSE v8 works with equipment from select leading defibrillator manufacturers to enable emergency medical personnel to transmit 12-lead ECGs from the field.

more ▸ **Expanding diagnostic capabilities:** The seamless connection of MUSE to MARS Ambulatory ECG and CARESCAPE* Clinical Information Center* (CIC) Pro facilitates streamlined cardiac Holter monitoring, with the potential of shortening time to diagnosis and treatment.



Capture your ECG revenue. You've earned it.

The easiest way to increase your facility's revenue is to avoid missed or delayed charges. Batch billing and automatic patient demographics data merges/updates through MUSE v8 to your facility's HIS help ensure prompt billing and accurate charge capture.

- **Help improve revenue and save staff time:** With enhanced accuracy and speed of billing
- **Reduce paper costs:** Through digital ECG workflow
- **Speed processing time:** Automatic data updates streamline administration processes
- **Increase accuracy of patient records:** Automatic merges and updates reduce manual re-entry of data

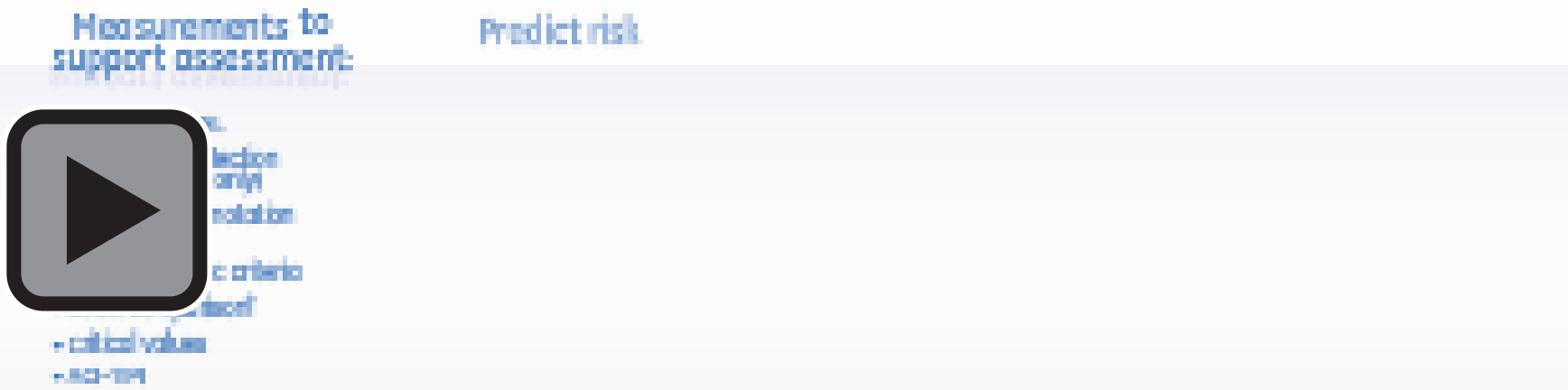
Leadership means working together

MUSE is designed to work with your suite of cardiology systems, whether they are from GE Healthcare or others. We also provide a comprehensive portfolio of diagnostic decision support products that will help your facility stand out as a leader in cardiology care.

- **Resting ECG systems**
- **CASE* Exercise Testing Systems**
- **MARS Ambulatory Holter System**
- **GE Healthcare Cath Lab**
- **CARESCAPE Clinical Information Center (CIC) Pro**
- **Centricity Cardiology System**
- **Performance Solutions Consulting Services**

Great minds think together. Industry-leading diagnostic tools.

Diagnostic confidence requires accurate information and expert decision support. GE Healthcare supports the expertise of your physicians with one of the most comprehensive portfolios of ECG clinical decision support tools, featuring the GE Marquette* 12SL* ECG analysis program. These analytical tools are available across the GE Healthcare portfolio of diagnostic cardiology products. Marquette 12SL is a preferred choice for physicians worldwide. It's also one of the most validated, with citations in more than 150 scientific journals.



[1]Available only in MUSE ECG Management System

More than an upgrade. A new standard.

MUSE v8 introduces new clinical functionality that empowers clinicians with more insights to support fast, confident clinical decisions.

more ▸ **HD pacemaker detection:** The MAC 5500 HD uses a high sample rate (75,000 samples per second) to detect pacemaker pulses as faint as 0.2 ms in duration and 0.5-mV in amplitude, reducing the risk of treatment contraindicated for paced patients.[1]

more ▸ **Customizable critical values:** Your clinicians perform many ECGs every day—knowing which ones need immediate attention can make a significant difference in patient outcomes.

The system is designed to help streamline ECG review and speed time to treatment for the patients who need it most.

more ▸ **12SL ECG reanalysis:** Gain the advantage of the latest MUSE v8 software to reanalyze ECGs through the most recent 12SL analysis program.

We put you in the lead. Then we stand behind you all the way.

We understand that you can't afford delays or downtime. That's why our experts work with your team to make installation, implementation, and operation of your MUSE v8 system easy.

Technical support and training varies by region. Please check with your local GE sales representative.

"GE Technical Support has been very helpful. To be able to call somebody on a Friday evening at 4:30 p.m. and say, 'This is the problem we've run into today,' and by 5 p.m. be back up and functioning, without needing an upset physician to call our internal tech support—that's a success for us."

Robert Long IV
Team Lead, Ancillary Clinical Applications
Aspirus Hospital

Our support network is ready to keep yours up and running

Our team stands with your team every step of the way, to help ensure your facility gets the most from your MUSE v8 system's capabilities.

Our dedicated IT project managers, HL7 specialists, database conversion specialists, and field engineers provide project management, system integration, training, and remote or on-site troubleshooting and support.

"Our partnership with GE Healthcare and this whole implementation project has been a very positive experience. One of the reasons is that we've had the right GE employees selected for the project. They've had the expertise. They've carried out their responsibilities and been able to see things from the customer's perspective. It's actually individuals who make this kind of project happen."

Ms. Iris Kytoniemi
IT Manager
HUSLAB, Helsinki, Finland

About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement, and performance solutions services helps our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our "healthymagination" vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

GE Healthcare, a division of General Electric Company

www.gehealthcare.com

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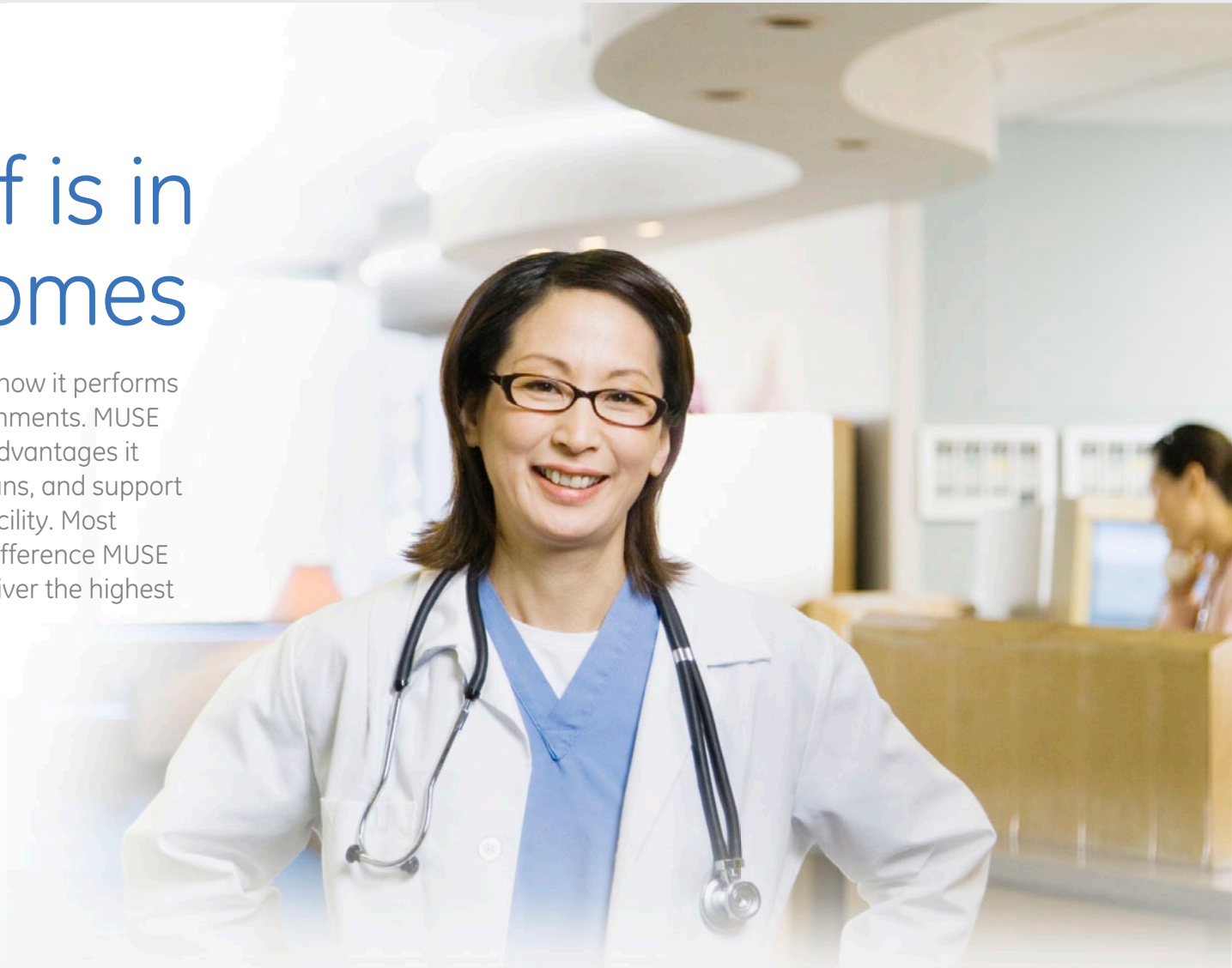
The proof is in the outcomes

The real test of any system is how it performs in the toughest clinical environments. MUSE customers can attest to the advantages it delivers for clinicians, physicians, and support personnel throughout their facility. Most important, they've seen the difference MUSE can make in helping them deliver the highest quality of patient care.



More MUSE details | MUSE case studies | Why choose GE Healthcare

MUSE Clinical Excellence | MUSE IT Connectivity | MUSE Leading Innovation | More About MUSE

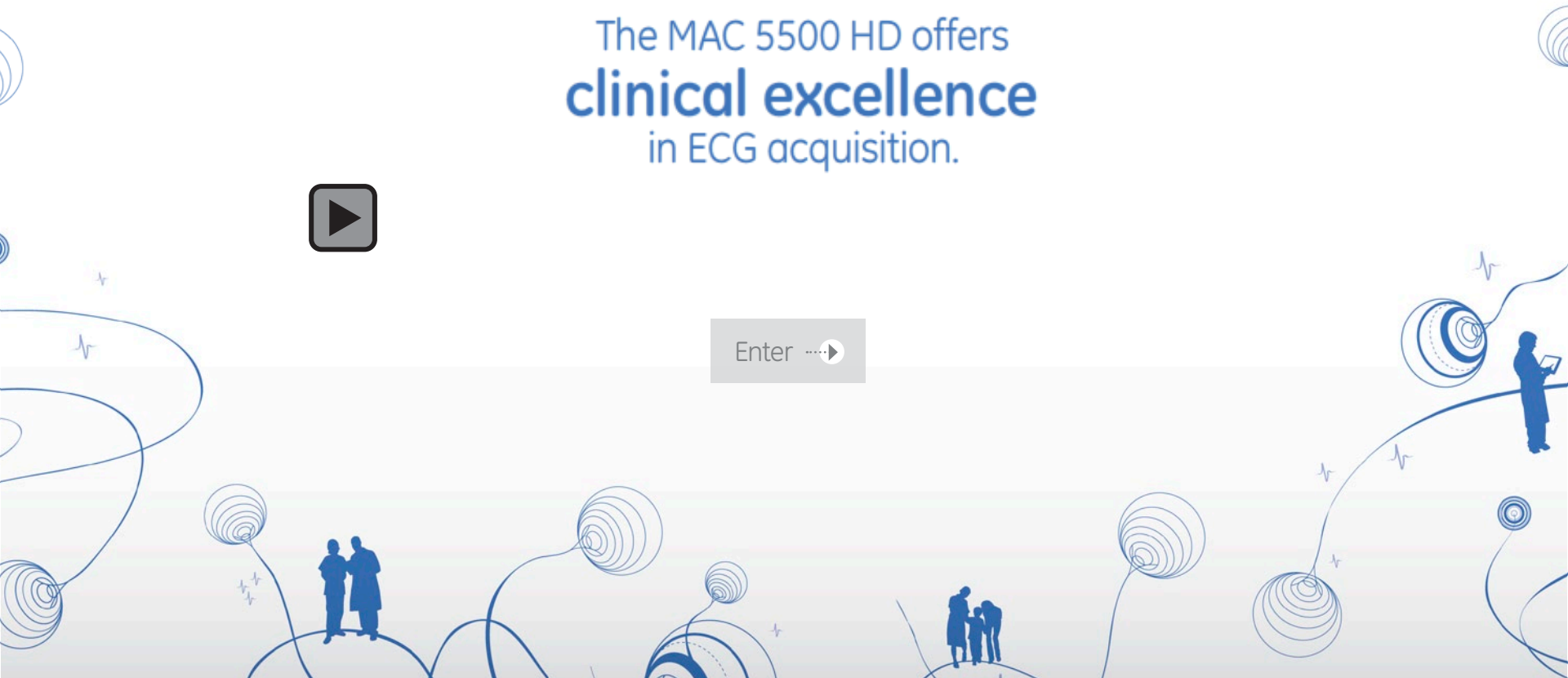
Skip intro

The MAC 5500 HD offers

clinical excellence

in ECG acquisition.

Enter



GE Healthcare

The ECG with more knowledge built in

Introducing the MAC* 5500 HD

If you can't see the pacemaker, you're not seeing the whole patient

During a patient's cardiac event, physicians have moments to make a diagnosis. Modern pacemakers are difficult to detect in standard ECGs, and inferring their presence takes time many clinicians simply don't have in an emergency situation.

Missed or inaccurate pacemaker detection can lead to incorrect diagnosis, wasted treatment time and costs, and increased risk for patients.

The MAC 5500 HD incorporates new tools for ECG acquisition, enabling confident clinical decisions with a three-step solution that delivers on speed and accuracy.

Advancing clinical excellence in three steps

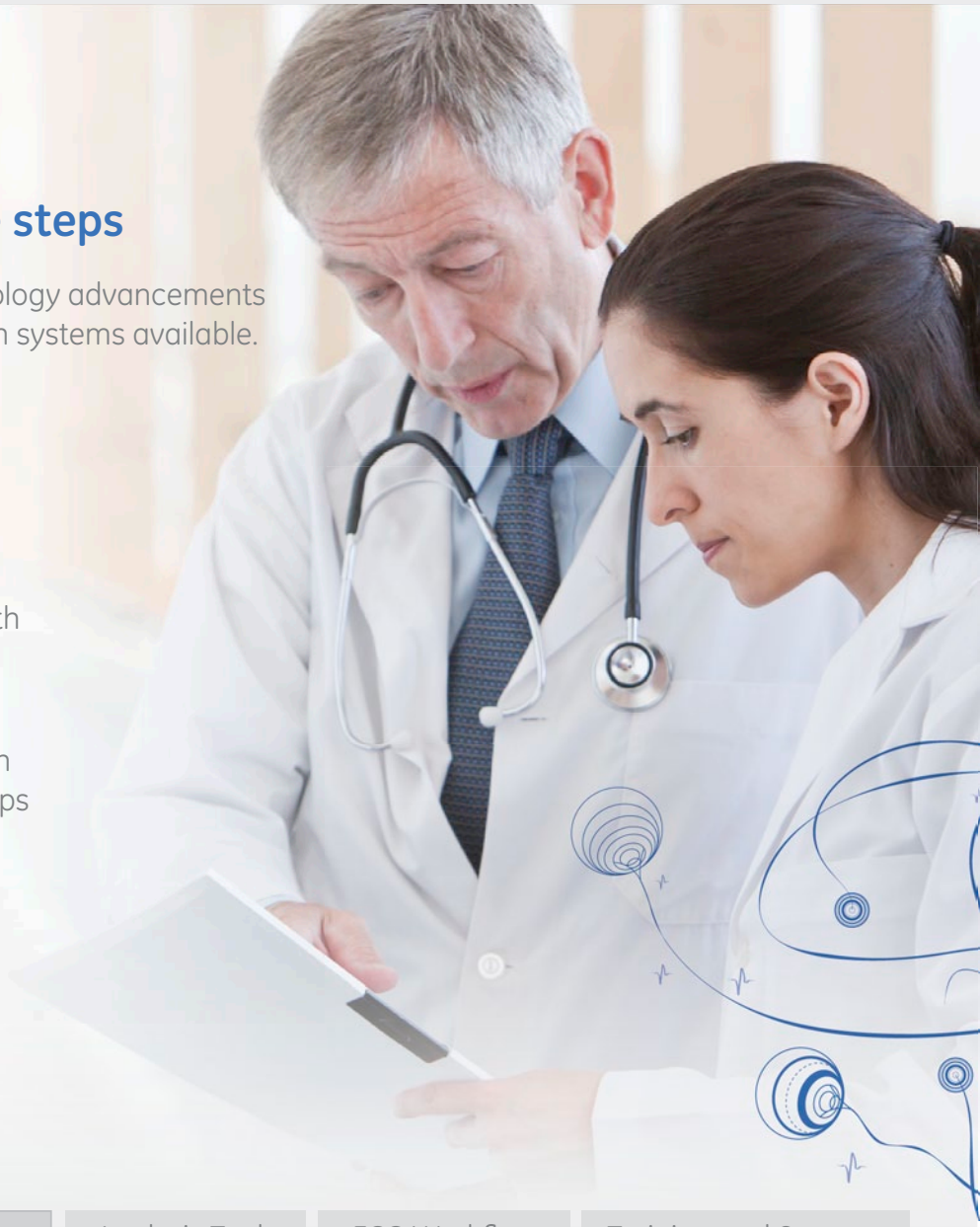
The MAC 5500 HD combines proven 12SL* analysis with technology advancements to provide one of the most advanced ECG pacemaker detection systems available.

more ▸ **Detect pacemaker pulses more accurately**[1] via a high sample rate, reducing the risk of treatment contraindicated for paced patients.

more ▸ **Advanced interpretation of paced rhythms** via the Marquette* 12SL program. The program can detect and report the underlying rhythm, increasing the breadth of decision support capabilities.

more ▸ **Clear visualization and annotation of pacer pulses** through MUSE* v8 Cardiology Information System, which provides a dedicated pace-annotation channel. This helps to reduce the need to identify pacer pulses within the ECG signal, supporting efficient diagnosis.

[1]Ricke AD, Swiryn S, Bauernfeind RA, Conner JA, Young B, Rowlandson GI. Improved pacemaker pulse detection: clinical evaluation of a new high-bandwidth electrocardiographic system. *J Electrocardiol* 2010; article in press. Co-authored in part by GE Healthcare employees.



Make every moment count: configurable critical values

Clinicians perform many ECGs every day. Quickly identifying those that need immediate attention can help improve outcomes when moments count. The MAC 5500 HD gives you configurable critical values that help streamline ECG review and speed time to treatment for the patients who need it most.

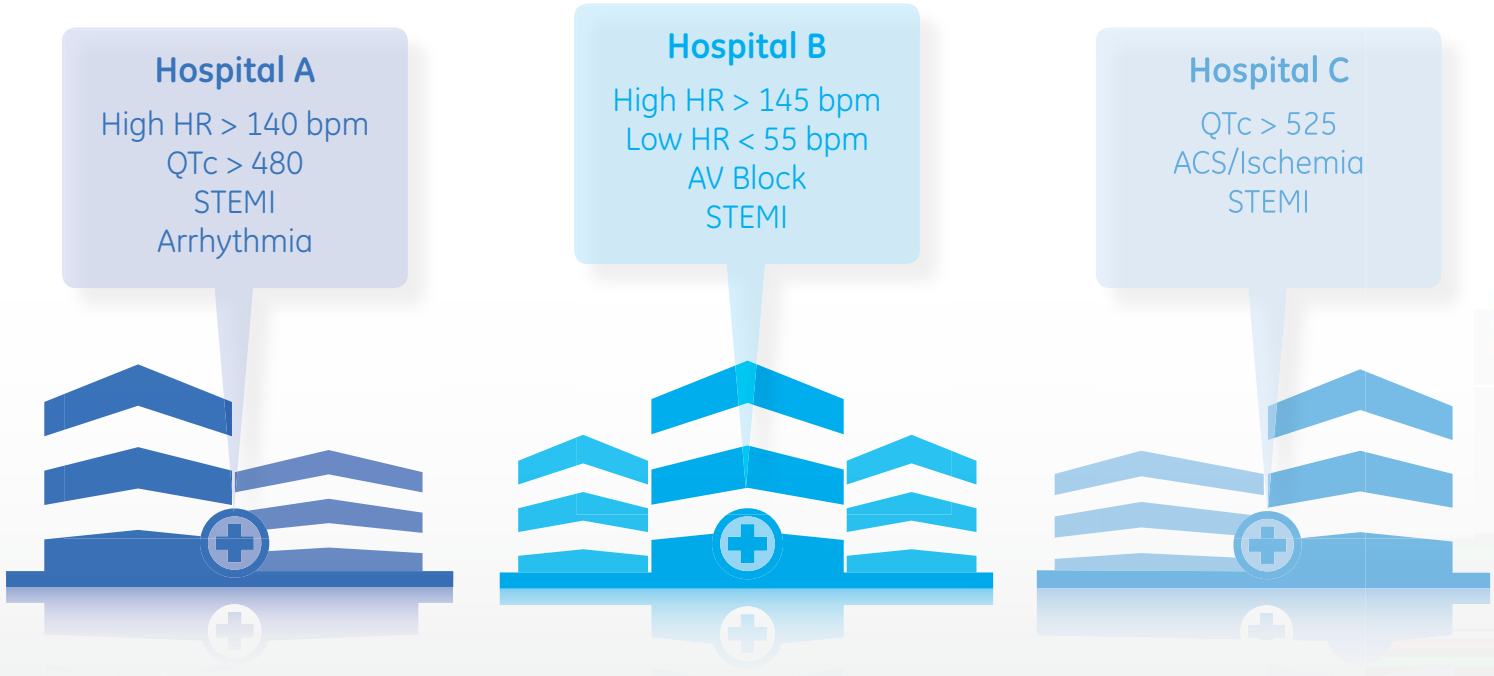
Configurable critical values help your hospital to:

- **Speed triage and treatment** with onscreen and printed notifications
- **Streamline workflow** by reducing time-consuming manual identification of critical values
- **Consistently report** critical conditions to help support patient safety goals

Defined by you. Delivered by the MAC 5500 HD.

The MAC 5500 HD gives you the power to customize, so you can configure critical values to help meet the goals of your facility and The Joint Commission reporting requirements.

Every hospital is unique—the MAC 5500 HD is designed to support the quality requirements and evolving needs of your facility.



Better triage enables better outcomes: Acute Coronary Syndrome algorithm

Acute Coronary Syndrome (ACS) is a major cause of emergency medical care visits. The ability to quickly and accurately triage patients can be a matter of life or death.

The MAC 5500 HD includes new 12SL algorithm enhancements that have been shown to help physicians identify ACS. A study has shown these enhancements:

- Improved the sensitivity of emergency physicians' interpretation of acute myocardial infarction by 50% and cardiologists' interpretations by 26%, with no loss of specificity[2]
- Improved the sensitivity of emergency physicians' acute ischemic syndrome interpretation by 53% while maintaining a specificity of 91%[2]

[2]Xue J, Aufderheide T, Wright RS, Klein J, Farrell R, Rowlandson I, Young B. Added value of new acute coronary syndrome computer algorithm for interpretation of prehospital electrocardiograms. *J Electrocardiol* 2004; 37 Suppl:233-239. Co-authored in part by GE Healthcare employees.

The tools you need. The results you trust.

The MAC 5500 HD offers a comprehensive suite of ECG interpretation and analysis programs, including an array of applications for arrhythmia and chest pain.

These tools help physicians address a wider range of disease management needs, make more efficient treatment decisions, and use invasive tests more judiciously.

- **Marquette 12SL algorithms:** A preferred choice of physicians worldwide. Includes gender-specific interpretation and ACI-TIPI.
- **12- and 15-lead ECG acquisition:** Facilitates assessment of both adult and pediatric patients—with confidence.
- **HookUp Advisor*:** Indicates lead signal quality, helping to ensure the best possible ECG signal is used.

HookUp Advisor

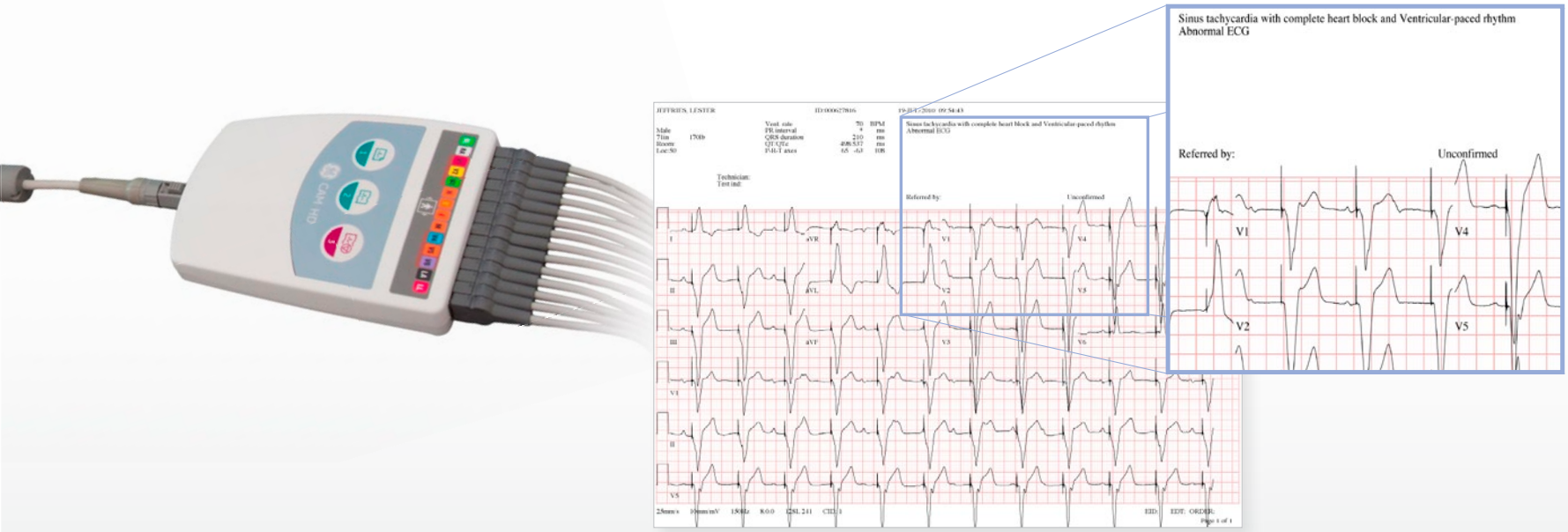
Connected ECG workflow: saving time when seconds count

The MAC 5500 HD lets you harness the power of the GE Healthcare MUSE v8—one of the industry's leading cardiology management systems—for streamlined workflow and greater functionality. Enhanced barcode workflow with orders and ADT download capability work together to help improve efficiency across the enterprise.

It's a system designed to help avoid costly misdiagnoses, automate processes for clinicians, and streamline workflow supporting improved quality of care and reduced cost for the hospital.

The difference is clear: the CAM HD acquisition module

Clear data is better data. The CAM HD acquisition module reduces noise and artifact for clearer ECG tracings. This enhanced clarity improves the system's ability to accurately detect the presence of pacemaker pulses and can decrease the need to redo ECGs due to poor data quality.



Powerful connections: your link to accuracy and speed

Access to all of the features of the MAC 5500 HD is made possible through tools and capabilities that build connectivity into every step of ECG acquisition, analysis, and transmission.

- **Barcode and magnetic card readers** automate the download of orders or ADT demographic data, helping reduce patient data entry time and errors
- **MobileLink* wireless capabilities** facilitate bi-directional communication with MUSE to retrieve, manage, and archive patients' data, streamlining workflow
- **Secure digital memory card** provides external archive capabilities and export options
- **Increased transmission speed** of ECG records into MUSE for faster workflow

New capabilities, familiar features, advanced training

The MAC 5500 HD system brings you improved functionality and clinical workflow while maintaining the familiar look and ease of use you expect from a GE Healthcare ECG system. And our training programs ensure that you get the most from your ECG equipment investment while supporting the ongoing education of your clinicians.

GE Healthcare offers a variety of ways to support your initial and ongoing training needs:

- **Train your way, at your own pace** with self-paced computer-based training or on-site training at your facility
- **Consistent staff knowledge** is fostered by providing the same high-quality training to all staff members
- **CEU credits** awarded through GE's computer-based training helps support the professional development of physicians and clinicians (U.S. only)

Training offers vary by region.

About GE Healthcare

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GE Healthcare

MUSE* v8

Cardiology information system

GE Healthcare-supplied MUSE server minimum specifications

Feature	Specification
Hardware	
Form Factor	Rack-Ready Server (4U)
Processor type and speed	Dual Core Intel® Zeon® Processor, 1.8 GHz
System memory (RAM)	2 GB
Hard drive capacity	584 GB
Hard drive configuration	6 x 146 GB
RAID	RAID 5 + 0
Optical drive	8 x CD/DVD-ROM
Floppy drive	Not included
Serial port	1
Parallel port	Not included
USB 2.0 port	4
Keyboard port	PS/2
Mouse port	PS/2
Video	Integrated ATI, 32 MB video standard 16 bit color: maximum resolution of 1280 x 1024
Network	4–10/100/1000 Mbps
Software	
Operating System	Microsoft® Windows® Server 2003 Std, SP2, R2 (32-bit edition)
Database Application	Microsoft SQL Server 2005 Std, SP3 (32-bit edition); 1 Processor license
Physical	
Dimensions (H x W x D)	21.92 x 44.45 x 67.31 cm (8.63 x 17.50 x 26.50 in)
Weight	Minimum: 26.76 kg (59 lbs) Maximum: 30.84 kg (68 lbs)
Power	
Input Voltage	100-240 VAC
Frequency	47-63 Hz
Environmental	
Operating temperature	+10°C to +35°C (+50°F to +95°F)
Operating humidity	10% to 90% relative humidity
Operating altitude	3,048 m (10,000 ft)
Storage temperature	-30°C to +60°C (-22°F to +140°F)
Storage humidity	5% to 95% relative humidity
Storage altitude	9,144 m (30,000 ft)

Specifications outlined above reflect hardware provided by GE Healthcare at the time of Specification Sheet publication. GE reserves the right to replace the hardware above with hardware that meets or exceeds these specifications at any time without notice or obligation.

GE hardware is sold in the U.S. only.

Return to More About MUSE

GE Healthcare-supplied MUSE client workstation minimum specifications

Feature	Specification
Hardware	
Processor type and speed	Intel Core 2 Duo, 2.13 GHz
System memory (RAM)	1 GB
Hard drive capacity	160 GB
Optical drive	16 x DVD-ROM
Floppy drive[1]	External USB Drive
Serial port[2]	2
Parallel port	1
USB 2.0 port[3]	4
Keyboard port	PS/2
Mouse port	PS/2
Video	Integrated Intel Graphics Media Accelerator 3000 2048x1536, 32-bit color (256 MB video standard)
Network	1–10/100/1000 Mbps
Software	
Operating System	Microsoft Windows XP Pro, SP3 (32-bit edition)
Physical	
Dimensions (H x W x D)	10.00 x 34.00 x 38.00 cm (3.94 x 13.4 x 15 in)
Weight	8.8 kg (19.4 lbs)
Power	
Input Voltage	100-240 VAC
Frequency	50/60 Hz
Environmental	
Operating temperature	+10°C to +40°C (+50°F to +104°F)
Operating humidity	20% to 85% relative humidity
Operating altitude	3,048 m (10,000 ft)
Storage temperature	-30°C to +60°C (-22°F to +140°F)
Storage humidity	5% to 90% relative humidity
Storage altitude	9,144 m (30,000 ft)

[1]Required for local data acquisition from a floppy diskette.

[2]Required for local data acquisition or order download through a modem, or to support an outbound fax modem. Two would be required to support both modems.

[3]Required for SD Card Reader support and for either local data acquisition from, or for order download to an SD card.

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GE Healthcare-supplied HL7 server minimum specifications

Feature	Specification
Hardware	
Form Factor	Rack-Ready Server (1U)
Processor type and speed	2-Intel Xeon, Dual Core 1.60 GHz
System memory (RAM)	4 GB
Hard drive capacity	72 GB
Hard drive configuration	2 x 72 GB
RAID	RAID 1
Optical drive	24 x CD-ROM
Floppy drive	Not included
Serial port	1
Parallel port	Not included
USB 2.0 port	3
Keyboard port	PS/2
Mouse port	PS/2
Video	1280 x 1024 x 16M color (32 MB video standard)
Network	2–10/100/1000 Mbps
Software	
Operating System	Microsoft Windows Server 2003 Std, SP2, R1 (32-bit edition)
Physical	
Dimensions (H x W x D)	4.32 x 42.62 x 69.22 cm (1.70 x 16.78 x 27.25 in)
Weight	16.8 kg (37 lbs)
Power	
Input Voltage	100-240 VAC
Frequency	50/60 Hz
Environmental	
Operating temperature	+10°C to +35°C (+50°F to +95°F)
Operating humidity	10% to 90% relative humidity
Operating altitude	3,048 m (10,000 ft)
Storage temperature	-40°C to +70°C (-40°F to +158°F)
Storage humidity	5% to 95% relative humidity
Storage altitude	70 kPa (10,000 ft)

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MUSE EveryWARE specifications

GE Healthcare-supplied minimum specifications

Feature	Specification
Citrix	
Version	Citrix® Presentation Server™ 4.0
Hardware	
Form Factor	Rack-Ready Server (1U)
Processor type and speed	2-Intel Xeon, Dual Core 1.60 GHz
System memory (RAM)	4 GB
Hard drive capacity	72 GB
Hard drive configuration	2 x 72 GB
RAID	RAID 1
Optical drive	24 x CD-ROM
Floppy drive	Not included
Serial port	1
Parallel port	Not included
USB 2.0 port	3
Keyboard port	PS/2
Mouse port	PS/2
Video	1280 x 1024 x 16M color (32 MB video standard)
Network	2–10/100/1000 Mbps
Software	
Operating System	Microsoft Windows Server 2003 Std, SP2, R1 (32-bit edition)
Physical	
Dimensions (H x W x D)	4.32 x 42.62 x 69.22 cm (1.70 x 16.78 x 27.25 in)
Weight	16.8 kg (37 lbs)
Power	
Input Voltage	100-240 VAC
Frequency	50/60 Hz
Environmental	
Operating temperature	+10°C to +35°C (+50°F to +95°F)
Operating humidity	10% to 90% relative humidity
Operating altitude	3,048 m (10,000 ft)
Storage temperature	-40°C to +70°C (-40°F to +158°F)
Storage humidity	5% to 95% relative humidity
Storage altitude	70 kPa (10,000 ft)

MUSE v8 validated for use on Citrix Presentation Server 4.0 & 4.5 and XenApp 5.0.

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Customer-supplied hardware

Minimum Specifications

	MUSE Application / Database Server	MUSE Client Workstation	HL7 Server
Form Factor	Tower or Rack	Desktop or Mini Tower	Tower or Rack
Processor type and speed	Intel Xeon 2 GHz with 512k L2 Cache, or performance equivalent	Intel Pentium 4, 3.0 GHz, or performance equivalent	Two Intel Xeon, single core 2.8 GHz single core Xeon, or performance equivalent
System memory (RAM)	1 GB	512 MB (Windows XP) 1 GB (Windows 7)	2 GB
Hard disk	18 GB C: partition (system partition) 72 GB D: partition (database partition) – see "System Sizing Information" in the pre-installation manual for more information	4 GB (Windows XP) 16 GB (Windows 7) C: or D: partition	2 x 72 GB SCSI HDDS with 18 GB free on C: partition
RAID	Recommended	Recommended	Recommended
Optical drive	CD/DVD-ROM	CD/DVD-ROM	CD/DVD-ROM
Floppy drive	Customer preference	Required for local data acquisition from a floppy diskette.	Customer preference
Serial port	1* see "Optional hardware requirements" below	Required for local data acquisition or order download through a modem, or to support an outbound fax modem. Two would be required to support both modems.	1 or none – only required for remote modem support (if network connection not available)
Parallel port	Customer preference	Customer preference	Customer preference
USB 2.0 port	2	Required for SD Card Reader support and for either local data acquisition from, or for order download to an SD card.	2
Keyboard port	1	1	1
Mouse port	1	1	1
Video	Capable of 1024 x 768 resolution	1024 x 768 resolution	1024 x 768 resolution
Network	1-10/100/1000 Mbps Ethernet	1-10/100/1000 Mbps Ethernet	1-10/100/1000 Mbps Ethernet
Operating System	Supports: Microsoft Windows Server 2003 Std, SP2, R1/R2 (32-bit edition) Microsoft Windows Server 2008 Std, SP2, R1 (32-bit edition)	Supports: Microsoft Windows 2000 Pro, SP4 (32-bit edition) Microsoft Windows XP Pro, SP3 (32-bit edition) Microsoft Windows 7 Ultimate (32-bit edition)	Supports: Microsoft Windows Server 2003 Std, SP2, R1/R2 (32-bit edition))
Database Application	Supports: Microsoft Windows Server 2005, SP3	N/A	N/A

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Customer-supplied hardware

Recommended Specifications

	MUSE Application / Database Server	MUSE Client Workstation	HL7 Server
Form Factor	Tower or Rack	Desktop or Mini Tower	Tower or Rack
Processor type and speed	Dual Core Intel Xeon with 4 MB L2 cache, or performance equivalent	Core 2 Duo 2.13 GHz, or performance equivalent	Two Intel Xeon, single core 2.8 GHz single core Xeon, or performance equivalent
System memory (RAM)	2 GB	512 MB (Windows XP) 1 GB (Windows 7)	2 GB
Hard disk	18 GB C: partition (system partition) 72 GB D: partition (database partition) – see "System Sizing Information" in the pre-installation manual for more information	4 GB (Windows XP) 16 GB (Windows 7) C: or D: partition	2 x 72 GB SCSI HDDS with 18 GB free on C: partition
RAID	Recommended	Recommended	Recommended
Optical drive	CD/DVD-ROM	16 x DVD-ROM	CD/DVD-ROM
Floppy drive	Customer preference	Required for local data acquisition from a floppy diskette.	Customer preference
Serial port	1* see "Optional hardware requirements" below	Required for local data acquisition or order download through a modem, or to support an outbound fax modem. Two would be required to support both modems.	1 or none – only required for remote modem support (if network connection not available)
Parallel port	Customer preference	Customer preference	Customer preference
USB 2.0 port	2	Required for SD Card Reader support and for either local data acquisition from, or for order download to an SD card.	2
Keyboard port	1	1	1
Mouse port	1	1	1
Video	Capable of 1024 x 768 resolution	1280 x 1024 resolution	1024 x 768 resolution
Network	1-100/1000 Mbps Ethernet	1-100/1000 Mbps Ethernet	1-100/1000 Mbps Ethernet
Operating System	Supports: Microsoft Windows Server 2003 Std, SP2, R1/R2 (32-bit edition) Microsoft Windows Server 2008 Std, SP2, R1 (32-bit edition)	Supports: Microsoft Windows 2000 Pro, SP4 (32-bit edition) Microsoft Windows XP Pro, SP3 (32-bit edition) Microsoft Windows 7 Ultimate (32-bit edition)	Supports: Microsoft Windows Server 2003 Std, SP2, R1/R2 (32-bit edition)
Database Application	Supports: Microsoft SQL Server 2005 Std, SP3	N/A	N/A

Optional hardware requirements

Digi AccelePort® 8-port PCI adapter (Digi part number 77000889) with 8-port DB9
- Configured for COM 3 - COM 10.
- Required for multiple CSI or Fax modems attached to a file server

Customer-supplied hardware

Virtual Hardware Specifications

	MUSE Application / Database Server	HL7 Server
Processor type and speed	One processor license allocated, 2.6 GHz or performance equivalent	Two processor licenses allocated, 2.8 GHz or equivalent
System memory (RAM)	1 GB minimum, 2 GB recommended	2 GB minimum, 4 GB recommended
Hard disk	Use the hard drive capacity recommended specifications for physical servers taking into account current size, expected growth, and ability to increase storage space as required	Use the hard drive capacity recommended specifications for physical servers taking into account current size, expected growth, and ability to increase storage space as required
Optical drive	Virtual CD/ROM needed for software installation	Virtual CD/ROM needed for software installation
Network	One virtual Network Interface Card (NIC) connected to 1 GB shared virtual switch	N/A
Operating System	Use the operating system recommended specifications for physical servers	Use the operating system recommended specifications for physical servers
Database Application	Use the database application recommended specifications for physical servers	Use the database application recommended specifications for physical servers

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MUSE System Requirements

Networking requirements

To ensure proper MUSE system operation on a network, some form of NetBIOS name resolution such as WINS, DNS or LMHOSTS must be used. All routers, switches, WANs, LANs, and other networking infrastructure must support Microsoft TCP/IP. Network "health" and response times can affect the MUSE system performance. The amount of time required to display the Edit List or a particular test will depend on the number of tests on the Edit List, the speed of the network, and, in the case of a particular test, the size of that test.

File Server: Requires a static IP address

Clients: Either static or DHCP assigned IP addresses can be supported.

Physical layer

All network cabling must conform to the pertinent IEEE 802.X standard, and the customer must test it prior to system installation.

Connectivity

Each MUSE client must be able to connect to the MUSE file server over the network. See the pre-installation manual for more information about the required network ports.

Utilization

For optimum MUSE System performance, Ethernet bandwidth utilization, on average without the MUSE system running must be less than 18% of the available bandwidth for each MUSE system node's network segment. Total Ethernet bandwidth utilization on average must be less than 30% and the maximum peak utilization level must be less than 55%. The broadcast levels on any segment that a MUSE system node is connected to may not exceed 10%.

Reliability

The overall error rate of a network segment must be less than 2% of the available bandwidth. When integrating the MUSE System at a customer facility, additional integration charges may apply when either of the following conditions occur:

- The MUSE system network is not on a standalone Local Area Network (LAN)
- The MUSE system standalone LAN will be used to support any products, devices, or information other than GE Healthcare supported products specifically sold under this agreement.

Network printing requirements

The MUSE file server can be the print server or can send to a print server. UNC (Universal Naming Convention) paths are used to configure the destination for laser printing from within the MUSE application. The MUSE system does not print directly to Windows-defined printers.

The following three general options exist for MUSE network printing:

1. A printer connected directly to the network and then shared (or made for use) by a server. The server reduces collisions from multiple transmissions to this printer. It also provides queuing and possibly a retry mechanism.
2. A printer connected to an LPT port on a computer and then shared by that computer.
3. A printer connected to an LPT port on a computer, but not shared. This facilitates printing to MUSE EveryWARE clients and would be the intended use of setting up a printer this way.

NOTE: The first option is the preferred configuration for network printing for the MUSE system. It is recommended when generating Postscript Level 2 reports from a MUSE system to have Postscript software from Adobe® and a laser printer with 14 MB RAM or more.

Warranty

Standard warranty is one year for hardware.

Standard warranty is 90 days for software.

Ordering information

Visit gehealthcare.com or contact your local GE Healthcare representative.

Guidelines for VMware

Please refer to the 2034539-044 MUSE Cardiology Information System Pre-Installation Manual for specific implementation-related guidelines under the VM environment.

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DC-0201-04.11-EN-US

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The Connection
Effective solutions. Real results.
Volume 2, Issue 2

Tapping into the Power of Connectivity

IDN improves clinical decision-making by linking cardiology information system to electronic medical records

> ***"The real value of MUSE that I think other technologies struggle with is integration. MUSE is probably the most user-friendly and efficient technology out there for HIS and EMR connectivity and for integration through the healthcare network."***
>
> ***— Scott Garavet, Cardiovascular Administrator for the Aspirus Heart and Vascular Institute***

About Aspirus

Non-profit, community-directed healthcare system based in Wausau, WI.

Service area covers 600,000 people in 14 counties in north-central Wisconsin and seven counties of the upper peninsula of Michigan.

Integrated delivery network with five hospitals; home health and hospice care; pharmacies; critical care and helicopter transport service; durable medical goods; skilled nursing homes; a large volunteer corps; an affiliated physician network; a philanthropic and research foundation; and an extensive network of clinics.

Aspirus is proving the value of integrating a comprehensive cardiology information system with hospital electronic medical records. Physicians at Aspirus cover an expansive geographic area in a variety of clinical settings and are now able to access the information they need—wherever and whenever it is needed—to support critical diagnoses and medical decisions. The cardiology information system also has been successfully integrated into the organization's billing system, helping to improve charge capture. This connectivity translates to greater efficiency, better patient evaluations, and enhanced data security.

When Aspirus decided to upgrade its cardiology information system, three of the most important factors to consider were accuracy, access, and quality.

The Challenge

- Integrating clinical information from different devices and locations into the EMR and HIS system
- Increasing efficiency, accuracy, and quality in a variety of clinical settings
- Providing faster diagnosis and decision-making to improve patient care

The Results

- Turnaround time for ECG and stress reads has gone from 2 to 3 days to less than 24 hours, with ECG reads often taking place within 1 hour or 2
- Pre-hospital 12-lead ECG to support emergency medical services and remote communities
- Door-to-balloon times are less than 30 minutes
- Results available throughout the health system
- Revenue protection through better patient charge captures

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"We were moving toward an integrated, enterprise-based system," says Robert Taylor Long IV, Application Team lead for Aspirus IT. "MUSE has made our whole system function seamlessly and allows our various sites to easily send and retrieve information."

Accessibility is a significant advantage for a complex health system like Aspirus. Rachel Snow, director of cardiovascular procedural services at Aspirus Heart and Vascular Institute, noted it used to be paper-based with longer turnaround times. "Physicians can access the system from their home, clinic, or outlying hospitals," Snow says.

Aside from the MAC® 12/15-lead electrocardiographs, Aspirus also has GE Dash® and Solar® bedside monitors, MARS® Holter Systems and CASE® stress testing equipment all integrated into its MUSE®. "As our enterprise grows, the system is able to handle submissions from multiple devices and sites," Long says. "The ability to compare current and previous ECGs increases the longitudinal record and makes it transparent."

"Before MUSE was implemented, to compare with a previous ECG, we had to retrieve the paper medical record, which could take awhile—and you certainly couldn't do it from home," says Dr. German Lorain, director of noninvasive cardiology. "Now I can review the information online and quickly make a decision. Faster access to information has improved our ability to deliver better patient care."

Managing growth is a challenge facing many health systems. "We used to provide ECG services to four or five clinics, and now there are more than 40," Snow says. "The clinics would call and request test results, and it used to require much more time to locate, study, and report back. With online access, we've eliminated those extra phone calls and time involved to respond."

Snow also contends there have been benefits in terms of organizational efficiencies and better service for patients. "Turnaround time for ECG and stress reads used to be two or three days, and sometimes longer," Snow says. "But it's now down to less than 24 hours. It's not uncommon to have the ECG read within an hour or two."

The patient charge capture process also has improved. "Since the information goes directly into our billing system from Epic, we're able to bill for all the ECG, Stress or Holter tests we're performing, so we're not losing revenue," Snow says.

"MUSE is a timely, accurate, and comprehensive system that has helped create a platform for more efficient communication among physicians across our entire system," says Scott Garavet, cardiovascular administrator for the Aspirus Heart and Vascular Institute.

Lorain says MUSE has been important in terms of clinical pathways and standardization of care, particularly in treating patients with acute myocardial infarction, acute coronary syndromes, or arrhythmias.

Aspirus has developed a system in which every patient with chest pain gets an ECG in the field and that information is transmitted to the hospital emergency room. If the patient has previous ECGs in MUSE, the physician can compare the pre-hospital ECG to prior records

The value of the pre-hospital 12-lead ECG has had a significant impact on Aspirus, allowing the IDN to work effectively with emergency medical services and the local communities. With MUSE, Taylor says, it has been possible in some instances to bypass the emergency department and transport the patient immediately to the Cath Lab. "Our door to balloon times are sometimes less than 30 minutes in patients transferred with an ECG in the field," Lorain says.

The remote ECG capability has been especially beneficial for communities that are further away from normal tertiary care centers. Garavet says it has had a bigger impact than any other technology in terms of facilitating rapid diagnosis and care of the ST elevated MI patient.

Aspirus takes great pride in being consistently ranked among the top healthcare facilities in the country for cardiac care—an accomplishment attributed in part to clinical expertise, innovation, and the implementation of leading technologies. "The level of excellence and the awards we have received have been due to the standard system we've put into place," Lorain says, "and GE MUSE has been an important part of that system."

The Connection *is presented by GE Healthcare. Special thanks to Dr. German Lorain, Robert Taylor Long IV, Rachel Snow and Scott Garavet from Aspirus for their contributions.*

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Volume 1, Issue 1

Reducing door-to-balloon time to speed up treatment.

"Our cardiac care center was recently rated No. 1 in the state. We couldn't have done it without the MUSE system. Now we can have the necessary medical personnel ready when the patient arrives."

— Beth Relle, RN, BSN, Clinical Lead, Advocate Good Shepherd Hospital

Advocate Good Shepherd Hospital, Barrington, IL, is a 183-bed facility with more than 600 physicians representing 45 specialties. It features a state-of-the-art, 56,000-square-foot emergency department and renowned cardiac care center.

To reduce door-to-balloon time and improve patient outcomes, the hospital trained paramedics to transmit 12-lead ECGs from their defibrillators directly to the emergency department via the MUSE® Cardiology Information System. This allows hospital staff to prepare the cath lab and gives cardiologists more time for diagnosis. "We even know what vessel is involved based on the ECG," says Beth Relle.

The Challenge

To more rapidly identify acute myocardial infarction patients and improve clinical outcomes, Advocate Good Shepherd implemented a program to reduce door-to-balloon time for emergency patients from 90 to 60 minutes. To achieve this goal, the hospital decided to use the GE MUSE Cardiology Information System's capabilities to streamline its patient workflow.

The Results

- Door-to-balloon time reduced from 90 to 60 minutes
- EMS training with the new system facilitated earlier detection
- Focused on improving clinical outcomes as a result of rapid intervention for acute myocardial infarction patients

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Acquiring 12-lead pre-hospital ECGs

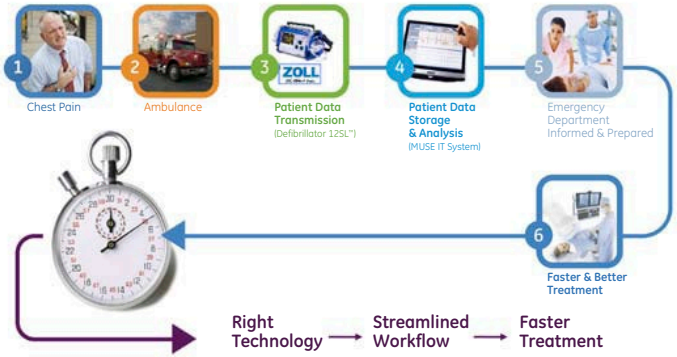
The hospital's old procedure for transmitting ECGs from the field was to fax them to the emergency department. This did not provide the emergency team with diagnosis-quality data, so treatment could not begin until a 12-lead ECG could be acquired at the hospital.

"We can begin preparation and diagnosis 15 to 20 minutes before patients arrive. Staff are waiting for patients, instead of the other way around."

— Chris Young, Cardio IS Administrator, Advocate Good Shepherd Hospital

To take advantage of the capabilities of the MUSE system, the hospital provided advanced training to its EMS departments to help them understand the whole process. This training enabled the EMS staff to acquire 12-lead ECGs in the field and call cardiac alerts.

Now the EMS teams are able to send the ECGs directly to MUSE, which allows for faster physician review. Additionally, since the same 12SL analysis program is used in the defibrillator that is used in the hospital's ECG device, the physician can compare the ECG from the ambulance to the patient's previous ECGs taken at the hospital. The MUSE serial comparison program provides a comprehensive overview of a patient's "cardiac history."



ECG information anywhere, anytime

Integrating the EMS process into MUSE allows pre-hospital ECGs to be viewed immediately and securely from anywhere in the hospital via the system's Web application. Physicians can connect securely from any desktop or laptop computer through the system's thin client solution. The system also lets emergency staff know if an ECG has been performed on that patient before. This has made a significant difference in diagnosis and treatment times.

The Connection *is presented by GE Healthcare. Special thanks to Beth Relle (R) and Chris Young (L) from Advocate Good Shepherd Hospital for their contributions.*

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Volume 1, Issue 3

Implementing MUSE to streamline ECG workflow.

"With MUSE®, capturing an ECG takes 10 minutes versus 45 minutes under the paper-based process. Billing is immediate. Press a button, and the billing is processed."

— Barbara Doerflein, Cardiac Technician, Info System MUSE Specialist, Pocono Medical Center

The Pocono Medical Center in East Stroudsburg, PA, is a 232-bed facility offering emergency and acute-care services. It offers a comprehensive cardiovascular program via its ESSA Heart and Vascular Institute and performed 27,093 ECGs in 2007.

The traditional paper ECG process at Pocono Medical Center was labor-intensive. Capturing an ECG took approximately 45 minutes. The entire process of getting the ECG signed and returned by the physician often took several days. And with the volume of ECGs increasing to almost 100 per day, paper records were rapidly consuming storage space.

The Challenge

Pocono Medical Center wanted to increase productivity, free up workspace and expedite over-reading of ECGs. In 2003, Pocono Medical Center implemented the GE Healthcare MUSE Cardiology Information System to streamline the ECG workflow process and gain efficiencies.

The Results

- Expedited ECG turnaround, meeting a goal of 24-hour processing
- Increased charge capture by more than 50 percent
- Provided remote access to physicians
- Enabled immediate availability to information
- Freed up workspace for more productivity
- Decreased 45 minutes of paper workflow to 10 minutes with digital process
- Saved 200,000 sheets of paper in ECG printing in 2007

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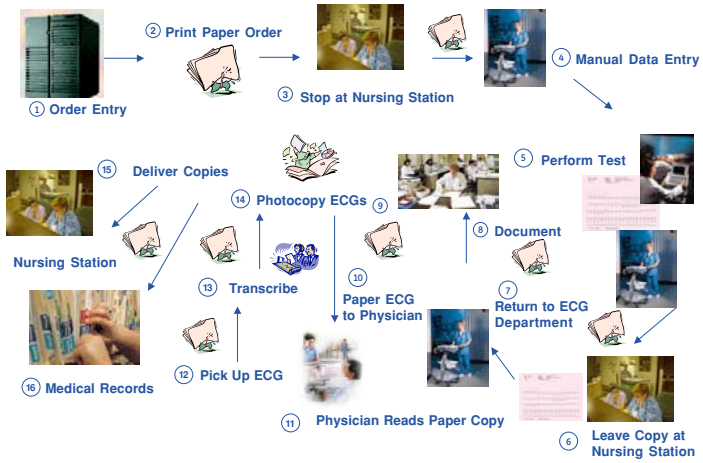
The old paper-based workflow

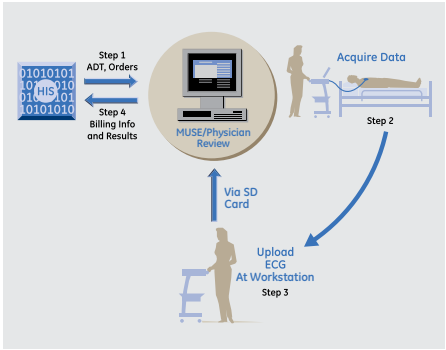


The entire process of getting the ECG signed and returned by the physician took several days. "We were doing everything manually," says Barbara Doerflein. "We had stacks of paper everywhere and spreadsheets to keep track of everything. It took a long time to track something down — the process just wasn't very productive."

The streamlined digital environment

The new system automated the process for ECG orders, results, billing and electronic signatures, allowing hospital staff to work more efficiently. Transmission can be completed in 30 seconds from one of several workstations available on each floor. As soon as the ECG is confirmed, it is transmitted via a Health Level Seven (HL7) interface directly to the hospital's electronic medical record (EMR) system. The time to capture an ECG decreased by 66% and went from 45 minutes down to 10 minutes.

"We asked the staff whether the MUSE system has increased productivity," Doerflein says. "Has it decreased the time to process orders? Does it deliver patient results more quickly? Does it increase accuracy? Is it easy to use? The answer to all of these questions was emphatically 'Yes!'"



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Volume 2, Issue 1

Enhancing Clinical Efficiency Throughout a Regional Healthcare System

Technology and process innovation create best practices in cardiology at Sharp HealthCare

"Having a comprehensive, customizable, and easily accessible system gives us the ability to correlate care across 19 clinics and 4 hospitals."

— Krista Fine, C.C.V.T., Clinical Imaging, Information Systems

Sharp HealthCare is a not-for-profit, integrated regional healthcare delivery system based in San Diego, CA. The system includes four acute-care hospitals, three specialty hospitals, and two medical groups, along with many other clinics, and services.

Sharp's strong commitment to excellence is exemplified by The Sharp Experience, an award-winning performance improvement initiative launched in 2001.

Krista Fine, C.C.V.T., Clinical Imaging, Information Systems, and former clinical lead for Heart and Vascular Services at Sharp Grossmont Hospital, says Sharp HealthCare is utilizing GE Healthcare's MUSE® Cardiology Information System to help improve efficiency, raise quality, and reduce costs. The systemwide effort makes it easier to share knowledge, training, and best practices within and beyond the organization.

"As our hospitals centralize electronic medical records, cardiology is leading the way in terms of standardizing procedures across a large enterprise. We're demonstrating how integration can work and the value that can be derived in terms of efficiency and quality by use of standardized systems, such as GE's MUSE system."

The Challenge

In 2007, Sharp HealthCare began developing a strategic plan to expand its ECG management system from two sites to the entire system. The goal was to create a systemwide enterprise cardiology database that would be easily accessible and adaptable to the needs of each facility. The Sharp team also sought to standardize user competencies, training, and future equipment acquisition.

The Results

- ECG interpretation accuracy increased from 85% to more than 99%
- Turnaround times decreased from an average of 15 hours to less than 5 hours
- Cost and time savings of a software-only solution with consistent 24/7 availability and support
- Data to help meet quality and compliance objectives

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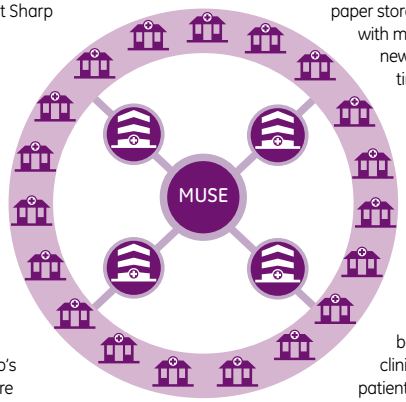
"With a fully integrated MUSE system, Sharp now has a strong foundation to build on for future cardiac expansion at our hospitals and clinics," Fine says. "Having a centralized server maintained by Sharp's IT specialists reduces downtime and allows a higher level of security to ensure HIPAA compliance."

With MUSE, a cardiologist can electronically view the current record while comparing it with the previous record, aiding in a more fully informed diagnosis. Since MUSE is available anywhere throughout Sharp's intranet system, authorized staff and physicians can quickly access all ECG records. Cardiologists with overreading privileges at Sharp Grossmont Hospital recently piloted this option through Sharp's secure portal to ensure ECG results are posted to the EMR within 5 hours. It was so successful that the Sharp Chula Vista facility soon followed suit and all facilities should have physicians reading online within a year.

Four hospitals and approximately 19 clinics are currently integrated into Sharp's MUSE system, performing more than 13,000 ECGs each month. "Having a comprehensive, customizable, and easily accessible system gives us the ability to correlate care when patients are seen at other sites," Fine says. "Furthermore, as one of the busiest STEMI centers in California, the technology has made it easier for our Grossmont emergency department to gather and review data and expedite Cath Lab treatment to an average of 50 patients per month with STEMI."

The Sharp team also has gained administrative efficiencies and cost benefits with the new system. MUSE helped eliminate the need for on-site paper storage and the time associated with managing those records. The new system also requires less time to complete, record, and correct billing, streamlining the patient charge process.



Sharp HealthCare supports the notion that pairing a solid technology solution with the right process and workflow changes delivers significant results. In this case, the positive impact is being felt by administration, clinicians, and, ultimately, the patients and communities served.

The Connection *is presented by GE Healthcare. Special thanks to Krista Fine from Sharp Grossmont Hospital for her contributions.*

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Volume 1, Issue 2

Simplified workflow for improved ECG turnaround.

"With the MUSE® system, the ECG is online before the electrodes are removed from the patient's chest."

— Christine A. Dindy, CCT, EKG Supervisor, Cardiovascular Center South Shore Hospital

South Shore Hospital of Massachusetts is a not-for-profit provider of acute, outpatient, home health and hospice care for 700,000 residents of southeastern Massachusetts. Its cardiovascular center features a team of more than 30 cardiologists, radiologists and vascular surgeons.

South Shore Hospital explained that its old process for capturing, analyzing and billing ECGs was labor-intensive and time-consuming, causing delays in ECG transmission, interpretation and billing. Despite consistent effort by the staff, the hospital's 48-hour turnaround goal was not being met.

The Challenge

The hospital sought to streamline its ECG process through implementing the GE Healthcare MUSE Cardiology Information System. The traditional paper process was slow and inefficient, impeding the hospital's goal of 48-hour ECG turnaround. With the MUSE system, South Shore Hospital was able to improve workflow and provide fast, easy access to ECG data.

The Results

- Improved workflow and reduced data entry errors
- Expedited ECG interpretation and report generation
- Reached goal of 24-hour maximum ECG turnaround time
- Achieved 100 percent physician usage of the new system
- Provided results to other physicians via the system's interface to the Meditech EMR
- Enabled remote access to ECG data for entire physician group

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The old ECG process

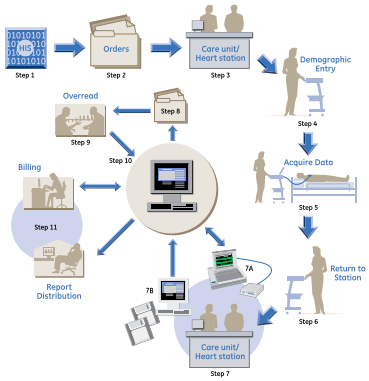
The old process, as described by South Shore Hospital, caused workload backups, because ECGs could not be downloaded into the system until the ECG technician returned from rounds. ECGs were often transmitted at the end of a shift, causing further delays. Batch transmission of data meant that cardiologists often had to read many ECGs at once; manual entry of interpretation corrections sometimes resulted in data entry errors.

Creating a wireless, seamless flow of data

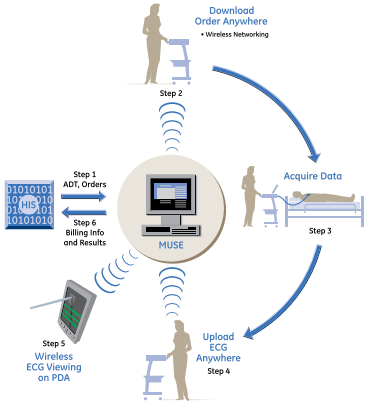
The MUSE system directs and manages the flow of ECG information, providing fast delivery of data and streamlined workflow. Wireless communication links expedite ECG availability and order download via wireless transmission of data between the ECG units and the MUSE system.

Implementation, training and buy-in from physicians

"The key to getting physicians to interpret ECGs online was to promote the system's biggest advantages, such as group in-baskets, remote access and accurate auto-interpretations," Dindy says. "We showed them there would be fewer delays in ECGs and no possibility of technicians or clerical staff entering the wrong information into the report."



Old ECG Workflow



New ECG Workflow

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